

WAC 296-62-07542 Appendix A—Substance technical guideline for formalin. (1) The following substance technical guideline for formalin provides information on uninhibited formalin solution (thirty-seven percent formaldehyde, no methanol stabilizer). It is designed to inform employees at the production level of their rights and duties under the formaldehyde standard whether their job title defines them as workers or supervisors. Much of the information provided is general; however, some information is specific for formalin. When employee exposure to formaldehyde is from resins capable of releasing formaldehyde, the resin itself and other impurities or decomposition products may also be toxic, and employers should include this information as well when informing employees of the hazards associated with the materials they handle. The precise hazards associated with exposure to formaldehyde depend both on the form (solid, liquid, or gas) of the material and the concentration of formaldehyde present. For example, thirty-seven to fifty percent solutions of formaldehyde present a much greater hazard to the skin and eyes from spills or splashes than solutions containing less than one percent formaldehyde. Individual substance technical guidelines used by the employer for training employees should be modified to properly give information on the material actually being used.

(a) Substance identification.

(i) Chemical name: Formaldehyde.

(ii) Chemical family: Aldehyde.

(iii) Chemical formula: HCHO.

(iv) Molecular weight: 30.03.

(v) Chemical abstracts service number (CAS number): 50-00-0.

Synonyms: Formalin; Formic Aldehyde; Paraform; Formol; Formalin (Methanol-free); Fyde; Formalith; Methanal; Methyl Aldehyde; Methylene Glycol; Methylene Oxide; Tetraoxymethalene; Oxomethane; Oxymethylene.

(b) Components and contaminants.

(i) Percent: 37.0 Formaldehyde.

(ii) Percent: 63.0 water.

Note: Inhibited solutions contain methanol.

(iii) Other contaminants: Formic acid (alcohol free).

Exposure limits:

(A) WISHA TWA-0.75 ppm.

(B) WISHA STEL-2 ppm.

(c) Physical data.

(i) Description: Colorless liquid, pungent odor.

(ii) Boiling point: 214°F (101°C).

(iii) Specific gravity: 1.08 (H₂O=1 @ 20 C).

(iv) pH: 2.8-4.0.

(v) Solubility in water: Miscible.

(vi) Solvent solubility: Soluble in alcohol and acetone.

(vii) Vapor density: 1.04 (Air=1 @ 20 C).

(viii) Odor threshold: 0.8-1 ppm.

(d) Fire and explosion hazard.

(i) Moderate fire and explosion hazard when exposed to heat or flame.

(ii) The flash point of thirty-seven percent formaldehyde solutions is above normal room temperature, but the explosion range is very wide, from seven to seventy-three percent by volume in air.

(iii) Reaction of formaldehyde with nitrogen dioxide, nitromethane, perchloric acid and aniline, or peroxyformic acid yields explosive compounds.

(iv) Flash point: 185°F (85°C) closed cup.

(v) Lower explosion limit: Seven percent.

(vi) Upper explosion limit: Seventy-three percent.

(vii) Autoignition temperature: 806°F (430°C).

(viii) Flammable class (WISHA): III A.

Extinguishing media:

(I) Use dry chemical, "alcohol foam," carbon dioxide, or water in flooding amounts as fog. Solid streams may not be effective. Cool fire-exposed containers with water from side until well after fire is out.

(II) Use of water spray to flush spills can also dilute the spill to produce nonflammable mixtures. Water runoff, however, should be contained for treatment.

(ix) National Fire Protection Association Section 325M Designation:

(A) Health: 2-Materials hazardous to health, but areas may be entered with full-faced mask self-contained breathing apparatus which provides eye protection.

(B) Flammability: 2-Materials which must be moderately heated before ignition will occur. Water spray may be used to extinguish the fire because the material can be cooled below its flash point.

(C) Reactivity: D-Materials which (in themselves) are normally stable even under fire exposure conditions and which are not reactive with water. Normal fire fighting procedures may be used.

(e) Reactivity.

(i) Stability: Formaldehyde solutions may self-polymerize to form paraformaldehyde which precipitates.

(ii) Incompatibility (materials to avoid):

(A) Strong oxidizing agents, caustics, strong alkalies, isocyanates, anhydrides, oxides, and inorganic acids.

(B) Formaldehyde reacts with hydrochloric acid to form the potent carcinogen, bis-chloromethyl ether. Formaldehyde reacts with nitrogen dioxide, nitromethane, perchloric acid and aniline, or peroxyformic acid to yield explosive compounds. A violent reaction occurs when formaldehyde is mixed with strong oxidizers.

(C) Hazardous combustion or decomposition products: Oxygen from the air can oxidize formaldehyde to formic acid, especially when heated. Formic acid is corrosive.

(f) Health hazard data.

(i) Acute effects of exposure.

(A) Ingestion (swallowing): Liquids containing ten to forty percent formaldehyde cause severe irritation and inflammation of the mouth, throat, and stomach. Severe stomach pains will follow ingestion with possible loss of consciousness and death. Ingestion of dilute formaldehyde solutions (0.03-0.04%) may cause discomfort in the stomach and pharynx.

(B) Inhalation (breathing):

(I) Formaldehyde is highly irritating to the upper respiratory tract and eyes. Concentrations of 0.5 to 2.0 ppm may irritate the eyes, nose, and throat of some individuals.

(II) Concentrations of 3 to 5 ppm also cause tearing of the eyes and are intolerable to some persons.

(III) Concentrations of 10 to 20 ppm cause difficulty in breathing, burning of the nose and throat, coughing, and heavy tearing of the eyes, and 25 to 30 ppm causes severe respiratory tract injury leading to pulmonary edema and pneumonitis. A concentration of 100 ppm is immediately dangerous to life and health. Deaths from accidental exposure to high concentrations of formaldehyde have been reported.

(C) Skin (dermal): Formalin is a severe skin irritant and a sensitizer. Contact with formalin causes white discoloration, smarting, drying, cracking, and scaling. Prolonged and repeated contact can cause numbness and a hardening or tanning of the skin. Previously exposed persons may react to future exposure with an allergic eczematous dermatitis or hives.

(D) Eye contact: Formaldehyde solutions splashed in the eye can cause injuries ranging from transient discomfort to severe, permanent corneal clouding and loss of vision. The severity of the effect depends on the concentration of formaldehyde in the solution and whether or not the eyes are flushed with water immediately after the accident.

Note: The perception of formaldehyde by odor and eye irritation becomes less sensitive with time as one adapts to formaldehyde. This can lead to overexposure if a worker is relying on formaldehyde's warning properties to alert him or her to the potential for exposure.

(E) Acute animal toxicity:

(I) Oral, rats: LD50=800 mg/kg.

(II) Oral, mouse: LD50=42 mg/kg.

(III) Inhalation, rats: LC50=250 mg/kg.

(IV) Inhalation, mouse: LC50=900 mg/kg.

(V) Inhalation, rats: LC50=590 mg/kg.

(g) Chronic effects of exposure.

(i) Carcinogenicity: Formaldehyde has the potential to cause cancer in humans. Repeated and prolonged exposure increases the risk. Various animal experiments have conclusively shown formaldehyde to be a carcinogen in rats. In humans, formaldehyde exposure has been associated with cancers of the lung, nasopharynx and oropharynx, and nasal passages.

(ii) Mutagenicity: Formaldehyde is genotoxic in several in vitro test systems showing properties of both an initiator and a promoter.

(iii) Toxicity: Prolonged or repeated exposure to formaldehyde may result in respiratory impairment. Rats exposed to formaldehyde at 2 ppm developed benign nasal tumors and changes of the cell structure in the nose as well as inflamed mucous membranes of the nose. Structural changes in the epithelial cells in the human nose have also been observed. Some persons have developed asthma or bronchitis following exposure to formaldehyde, most often as the result of an accidental spill involving a single exposure to a high concentration of formaldehyde.

(h) Emergency and first-aid procedures.

(i) Ingestion (swallowing): If the victim is conscious, dilute, inactivate, or absorb the ingested formaldehyde by giving milk, activated charcoal, or water. Any organic material will inactivate formaldehyde. Keep affected person warm and at rest. Get medical attention immediately. If vomiting occurs, keep head lower than hips.

(ii) Inhalation (breathing): Remove the victim from the exposure area to fresh air immediately. Where the formaldehyde concentration may be very high, each rescuer must put on a self-contained breathing apparatus before attempting to remove the victim, and medical personnel should be informed of the formaldehyde exposure immediately. If breathing has stopped, give artificial respiration. Keep the affected person warm and at rest. Qualified first-aid or medical personnel should administer oxygen, if available, and maintain the patient's airways and blood pressure until the victim can be transported to a medical facility. If exposure results in a highly irritated upper respiratory tract and coughing continues for more than ten minutes, the worker should be hospitalized for observation and treatment.

(iii) Skin contact: Remove contaminated clothing (including shoes) immediately. Wash the affected area of your body with soap or mild detergent and large amounts of water until no evidence of the chemical remains (at least fifteen to twenty minutes). If there are chemical burns, get first aid to cover the area with sterile, dry dressing, and bandages. Get medical attention if you experience appreciable eye or respiratory irritation.

(iv) Eye contact: Wash the eyes immediately with large amounts of water occasionally lifting lower and upper lids, until no evidence of chemical remains (at least fifteen to twenty minutes). In case of burns, apply sterile bandages loosely without medication. Get medical attention immediately. If you have experienced appreciable eye irritation from a splash or excessive exposure, you should be referred promptly to an ophthalmologist for evaluation.

(i) Emergency procedures.

(i) Emergencies:

(A) If you work in an area where a large amount of formaldehyde could be released in an accident or from equipment failure, your employer must develop procedures to be followed in event of an emergency. You should be trained in your specific duties in the event of an emergency, and it is important that you clearly understand these duties. Emergency equipment must be accessible and you should be trained to use any equipment that you might need. Formaldehyde contaminated equipment must be cleaned before reuse.

(B) If a spill of appreciable quantity occurs, leave the area quickly unless you have specific emergency duties. Do not touch spilled material. Designated persons may stop the leak and shut off ignition sources if these procedures can be done without risk. Designated persons should isolate the hazard area and deny entry except for necessary people protected by suitable protective clothing and respirators adequate for the exposure. Use water spray to reduce vapors. Do not smoke, and prohibit all flames or flares in the hazard area.

(ii) Special fire fighting procedures:

(A) Learn procedures and responsibilities in the event of a fire in your workplace.

(B) Become familiar with the appropriate equipment and supplies and their location.

(C) In fire fighting, withdraw immediately in case of rising sound from venting safety device or any discoloration of storage tank due to fire.

(j) Spill, leak, and disposal procedures.

(i) Occupational spill: For small containers, place the leaking container in a well ventilated area. Take up small spills with absorbent material and place the waste into properly labeled containers for later disposal. For larger spills, dike the spill to minimize contamination and facilitate salvage or disposal. You may be able to neutralize the spill with sodium hydroxide or sodium sulfite. Your employer must comply with EPA rules regarding the clean-up of toxic waste and notify state and local authorities, if required. If the spill is greater than 1,000 lb/day, it is reportable under EPA's superfund legislation.

(ii) Waste disposal: Your employer must dispose of waste containing formaldehyde in accordance with applicable local, state, and federal law and in a manner that minimizes exposure of employees at the site and of the clean-up crew.

(k) Monitoring and measurement procedures.

(i) Monitoring requirements: If your exposure to formaldehyde exceeds the 0.5 ppm action level or the 2 ppm STEL, your employer must monitor your exposure. Your employer need not measure every exposure if a "high exposure" employee can be identified. This person usually spends the greatest amount of time nearest the process equipment. If you are a "representative employee," you will be asked to wear a sampling device to collect formaldehyde. This device may be a passive badge, a sorbent tube attached to a pump, or an impinger containing liquid. You should perform your work as usual, but inform the person who is conducting the monitoring of any difficulties you are having wearing the device.

(ii) Evaluation of 8-hour exposure: Measurements taken for the purpose of determining time-weighted average (TWA) exposures are best taken with samples covering the full shift. Samples collected must be taken from the employee's breathing zone air.

(iii) Short-term exposure evaluation: If there are tasks that involve brief but intense exposure to formaldehyde, employee exposure must be measured to assure compliance with the STEL. Sample collections are for brief periods, only fifteen minutes, but several samples may be needed to identify the peak exposure.

(iv) Monitoring techniques: WISHA's only requirement for selecting a method for sampling and analysis is that the methods used accurately evaluate the concentration of formaldehyde in employees' breathing zones. Sampling and analysis may be performed by collection of formaldehyde on liquid or solid sorbents with subsequent chemical analysis. Sampling and analysis may also be performed by passive diffusion monitors and short-term exposure may be measured by instruments such as real-time continuous monitoring systems and portable direct reading instruments.

(v) Notification of results: Your employer must inform you of the results of exposure monitoring representative of your job. You may be informed in writing, but posting the results where you have ready access to them constitutes compliance with the standard.

(l) Protective equipment and clothing.

(Material impervious to formaldehyde is needed if the employee handles formaldehyde solutions of one percent or more. Other employees may also require protective clothing or equipment to prevent dermatitis.)

(i) Respiratory protection:

(A) Use NIOSH-approved full facepiece negative pressure respirators equipped with approved cartridges or canisters within the use limitations of these devices. (Present restrictions on cartridges and canisters do not permit them to be used for a full workshift.) In all other situations, use positive pressure respirators such as the positive-pressure air purifying respirator or the self-contained breathing apparatus (SCBA).

(B) If you use a negative pressure respirator, your employer must provide you with fit testing of the respirator at least once a year in accordance with the procedures outlined in WAC 296-62-07550 Appendix E.

(ii) Protective gloves:

(A) Wear protective (impervious) gloves provided by your employer, at no cost, to prevent contact with formalin.

(B) Your employer should select these gloves based on the results of permeation testing and in accordance with the ACGIH guidelines for selection of chemical protective clothing.

(iii) Eye protection:

(A) If you might be splashed in the eyes with formalin, it is essential that you wear goggles or some other type of complete protection for the eye.

(B) You may also need a face shield if your face is likely to be splashed with formalin, but you must not substitute face shields for eye protection. (This section pertains to formaldehyde solutions of one percent or more.)

(iv) Other protective equipment:

(A) You must wear protective (impervious) clothing and equipment provided by your employer at no cost to prevent repeated or prolonged contact with formaldehyde liquids.

(B) If you are required to change into whole-body chemical protective clothing, your employer must provide a change room for your privacy and for storage of your normal clothing.

(C) If you are splashed with formaldehyde, use the emergency showers and eyewash fountains provided by your employer immediately to prevent serious injury. Report the incident to your supervisor and obtain necessary medical support.

(2) Entry into an IDLH atmosphere. Enter areas where the formaldehyde concentration might be 100 ppm or more only with complete body protection including a self-contained breathing apparatus with a full facepiece operated in a positive pressure mode or a supplied-air respirator with full facepiece and operated in a positive pressure mode. This equipment is essential to protect your life and health under such extreme conditions.

(a) Engineering controls.

(i) Ventilation is the most widely applied engineering control method for reducing the concentration of airborne substances in the breathing zones of workers. There are two distinct types of ventilation.

(ii) Local exhaust: Local exhaust ventilation is designed to capture airborne contaminants as near to the point of generation as possible. To protect you, the direction of contaminant flow must always be toward the local exhaust system inlet and away from you.

(iii) General (mechanical):

(A) General dilution ventilation involves continuous introduction of fresh air into the workroom to mix with the

contaminated air and lower your breathing zone concentration of formaldehyde. Effectiveness depends on the number of air changes per hour.

(B) Where devices emitting formaldehyde are spread out over a large area, general dilution ventilation may be the only practical method of control.

(iv) Work practices: Work practices and administrative procedures are an important part of a control system. If you are asked to perform a task in a certain manner to limit your exposure to formaldehyde, it is extremely important that you follow these procedures.

(b) Medical surveillance.

(i) Medical surveillance helps to protect employees' health. You are encouraged strongly to participate in the medical surveillance program.

(ii) Your employer must make a medical surveillance program available at no expense to you and at a reasonable time and place if you are exposed to formaldehyde at concentrations above 0.5 ppm as an 8-hour average or 2 ppm over any fifteen-minute period.

(A) You will be offered medical surveillance at the time of your initial assignment and once a year afterward as long as your exposure is at least 0.5 ppm (action level) or 2 ppm (STEL).

(B) Even if your exposure is below these levels, you should inform your employer if you have signs and symptoms that you suspect, through your training, are related to your formaldehyde exposure because you may need medical surveillance to determine if your health is being impaired by your exposure.

(iii) The surveillance plan includes:

(A) A medical disease questionnaire.

(B) A physical examination if the physician determines this is necessary.

(iv) If you are required to wear a respirator, your employer must offer you a physical examination and a pulmonary function test every year.

(v) The physician must collect all information needed to determine if you are at increased risk from your exposure to formaldehyde. At the physician's discretion, the medical examination may include other tests, such as a chest x-ray, to make this determination.

(vi) After a medical examination the physician will provide your employer with a written opinion which includes any special protective measures recommended and any restrictions on your exposure. The physician must inform you of any medical conditions you have which would be aggravated by exposure to formaldehyde. All records from your medical examinations, including disease surveys, must be retained at your employer's expense.

(c) Emergencies.

(i) If you are exposed to formaldehyde in an emergency and develop signs or symptoms associated with acute toxicity from formaldehyde exposure, your employer must provide you with a medical examination as soon as possible.

(ii) This medical examination will include all steps necessary to stabilize your health.

(iii) You may be kept in the hospital for observation if your symptoms are severe to ensure that any delayed effects are recognized and treated.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-62-07542, filed 7/20/94, effective 9/20/94; 92-23-017 (Order 92-13), § 296-62-07542, filed 11/10/92, effective 12/18/92; 88-21-002 (Order 88-23), § 296-62-07542, filed 10/6/88, effective 11/7/88.]

WAC 296-62-07544 Appendix B—Sampling strategy and analytical methods for formaldehyde. (1) To protect the health of employees, exposure measurements must be unbiased and representative of employee exposure. The proper measurement of employee exposure requires more than a token commitment on the part of the employer. WISHA's mandatory requirements establish a baseline; under the best of circumstances all questions regarding employee exposure will be answered. Many employers, however, will wish to conduct more extensive monitoring before undertaking expensive commitments, such as engineering controls, to assure that the modifications are truly necessary. The following sampling strategy, which was developed at NIOSH by Nelson A. Leidel, Kenneth A. Busch, and Jeremiah R. Lynch and described in NIOSH publication No. 77-173 (Occupational Exposure Sampling Strategy Manual) will assist the employer in developing a strategy for determining the exposure of his or her employees.

(2) There is no one correct way to determine employee exposure. Obviously, measuring the exposure of every employee exposed to formaldehyde will provide the most information on any given day. Where few employees are exposed, this may be a practical solution. For most employers, however, use of the following strategy will give just as much information at less cost.

(3) Exposure data collected on a single day will not automatically guarantee the employer that his or her workplace is always in compliance with the formaldehyde standard. This does not imply, however, that it is impossible for an employer to be sure that his or her worksite is in compliance with the standard. Indeed, a properly designed sampling strategy showing that all employees are exposed below the PELs, at least with a ninety-five percent certainty, is compelling evidence that the exposure limits are being achieved provided that measurements are conducted using valid sampling strategy and approved analytical methods.

(4) There are two PELs, the TWA concentration and the STEL.

(a) Most employers will find that one of these two limits is more critical in the control of their operations, and WISHA expects that the employer will concentrate monitoring efforts on the critical component.

(b) If the more difficult exposure is controlled, this information, along with calculations to support the assumptions, should be adequate to show that the other exposure limit is also being achieved.

(5) Sampling strategy.

(a) Determination of the need for exposure measurements.

(b) The employer must determine whether employees may be exposed to concentrations in excess of the action level. This determination becomes the first step in an employee exposure monitoring program that minimizes employer sampling burdens while providing adequate employee protection.

(c) If employees may be exposed above the action level, the employer must measure exposure. Otherwise, an objective determination that employee exposure is low provides adequate evidence that exposure potential has been examined.

(d) The employer should examine all available relevant information, e.g., insurance company and trade association data and information from suppliers or exposure data collected from similar operations.

(e) The employer may also use previously-conducted sampling including area monitoring. The employer must make a determination relevant to each operation although this need not be on a separate piece of paper.

(f) If the employer can demonstrate conclusively that no employee is exposed above the action level or the STEL through the use of objective data, the employer need proceed no further on employee exposure monitoring until such time that conditions have changed and the determination is no longer valid.

(g) If the employer cannot determine that employee exposure is less than the action level and the STEL, employee exposure monitoring will have to be conducted.

(6) Workplace material survey.

(a) The primary purpose of a survey of raw material is to determine if formaldehyde is being used in the work environment and if so, the conditions under which formaldehyde is being used.

(b) The first step is to tabulate all situations where formaldehyde is used in a manner such that it may be released into the workplace atmosphere or contaminate the skin. This information should be available through analysis of company records and information on the MSDSs available through provisions of this standard and the hazard communication standard.

(c) If there is an indication from materials handling records and accompanying MSDSs that formaldehyde is being used in the following types of processes or work operations, there may be a potential for releasing formaldehyde into the workplace atmosphere:

(i) Any operation that involves grinding, sanding, sawing, cutting, crushing, screening, sieving, or any other manipulation of material that generates formaldehyde-bearing dust.

(ii) Any processes where there have been employee complaints or symptoms indicative of exposure to formaldehyde.

(iii) Any liquid or spray process involving formaldehyde.

(iv) Any process that uses formaldehyde in preserved tissue.

(v) Any process that involves the heating of a formaldehyde-bearing resin.

Processes and work operations that use formaldehyde in these manners will probably require further investigation at the worksite to determine the extent of employee monitoring that should be conducted.

(7) Workplace observations.

(a) To this point, the only intention has been to provide an indication as to the existence of potentially exposed employees. With this information, a visit to the workplace is needed to observe work operations, to identify potential

health hazards, and to determine whether any employees may be exposed to hazardous concentrations of formaldehyde.

(b) In many circumstances, sources of formaldehyde can be identified through the sense of smell. However, this method of detection should be used with caution because of olfactory fatigue.

(c) Employee location in relation to source of formaldehyde is important in determining if an employee may be significantly exposed to formaldehyde. In most instances, the closer a worker is to the source, the higher the probability that a significant exposure will occur.

(d) Other characteristics should be considered. Certain high temperature operations give rise to higher evaporation rates. Locations of open doors and windows provide natural ventilation that tend to dilute formaldehyde emissions. General room ventilation also provides a measure of control.

(8) Calculation of potential exposure concentrations.

(a) By knowing the ventilation rate in a workplace and the quantity of formaldehyde generated, the employer may be able to determine by calculation if the PELs might be exceeded.

(b) To account for poor mixing of formaldehyde into the entire room, locations of fans and proximity of employees to the work operation, the employer must include a safety factor.

(c) If an employee is relatively close to a source, particularly if he or she is located downwind, a safety factor of one hundred may be necessary.

(d) For other situations, a factor of ten may be acceptable. If the employer can demonstrate through such calculations that employee exposure does not exceed the action level or the STEL, the employer may use this information as objective data to demonstrate compliance with the standard.

(9) Sampling strategy.

(a) Once the employer determines that there is a possibility of substantial employee exposure to formaldehyde, the employer is obligated to measure employee exposure.

(b) The next step is selection of a maximum risk employee. When there are different processes where employees may be exposed to formaldehyde, a maximum risk employee should be selected for each work operation.

(c) Selection of the maximum risk employee requires professional judgment. The best procedure for selecting the maximum risk employee is to observe employees and select the person closest to the source of formaldehyde. Employee mobility may affect this selection; e.g., if the closest employee is mobile in his tasks, he may not be the maximum risk employee. Air movement patterns and differences in work habits will also affect selection of the maximum risk employee.

(d) When many employees perform essentially the same task, a maximum risk employee cannot be selected. In this circumstance, it is necessary to resort to random sampling of the group of workers. The objective is to select a subgroup of adequate size so that there is a high probability that the random sample will contain at least one worker with high exposure if one exists. The number of persons in the group influences the number that need to be sampled to ensure that at least one individual from the highest ten percent exposure

group is contained in the sample. For example, to have ninety percent confidence in the results, if the group size is ten, nine should be sampled; for fifty, only eighteen need to be sampled.

(e) If measurement shows exposure to formaldehyde at or above the action level or the STEL, the employer needs to identify all other employees who may be exposed at or above the action level or STEL and measure or otherwise accurately characterize the exposure of these employees.

(f) Whether representative monitoring or random sampling are conducted, the purpose remains the same to determine if the exposure of any employee is above the action level. If the exposure of the most exposed employee is less than the action level and the STEL, regardless of how the employee is identified, then it is reasonable to assume that measurements of exposure of the other employees in that operation would be below the action level and the STEL.

(10) Exposure measurements.

(a) There is no "best" measurement strategy for all situations. Some elements to consider in developing a strategy are:

- (i) Availability and cost of sampling equipment;
- (ii) Availability and cost of analytic facilities;
- (iii) Availability and cost of personnel to take samples;
- (iv) Location of employees and work operations;
- (v) Intraday and interday variations in the process;
- (vi) Precision and accuracy of sampling and analytic methods; and
- (vii) Number of samples needed.

(b) Samples taken for determining compliance with the STEL differ from those that measure the TWA concentration in important ways. STEL samples are best taken in a nonrandom fashion using all available knowledge relating to the area, the individual, and the process to obtain samples during periods of maximum expected concentrations. At least three measurements on a shift are generally needed to spot gross errors or mistakes; however, only the highest value represents the STEL.

(c) If an operation remains constant throughout the workshift, a much greater number of samples would need to be taken over the thirty-two discrete nonoverlapping periods in an 8-hour workshift to verify compliance with a STEL. If employee exposure is truly uniform throughout the workshift, however, an employer in compliance with the 1 ppm TWA would be in compliance with the 2 ppm STEL, and this determination can probably be made using objective data.

(11) Need to repeat the monitoring strategy.

(a) Interday and intraday fluctuations in employee exposure are mostly influenced by the physical processes that generate formaldehyde and the work habits of the employee. Hence, in-plant process variations influence the employer's determination of whether or not additional controls need to be imposed. Measurements that employee exposure is low on a day that is not representative of worst conditions may not provide sufficient information to determine whether or not additional engineering controls should be installed to achieve the PELs.

(b) The person responsible for conducting sampling must be aware of systematic changes which will negate the

validity of the sampling results. Systematic changes in formaldehyde exposure concentration for an employee can occur due to:

- (i) The employee changing patterns of movement in the workplace;
- (ii) Closing of plant doors and windows;
- (iii) Changes in ventilation from season to season;
- (iv) Decreases in ventilation efficiency or abrupt failure of engineering control equipment; and
- (v) Changes in the production process or work habits of the employee.

(c) Any of these changes, if they may result in additional exposure that reaches the next level of action (i.e., 0.5 or 1.0 ppm as an 8-hour average or 2 ppm over fifteen minutes) require the employer to perform additional monitoring to reassess employee exposure.

(d) A number of methods are suitable for measuring employee exposure to formaldehyde or for characterizing emissions within the worksite. The preamble to this standard describes some methods that have been widely used or subjected to validation testing. A detailed analytical procedure derived from the WISHA Method A.C.R.O. for acrolein and formaldehyde is presented below for informational purposes.

(e) Inclusion of WISHA's method in this appendix in no way implies that it is the only acceptable way to measure employee exposure to formaldehyde. Other methods that are free from significant interferences and that can determine formaldehyde at the permissible exposure limits within ± 25 percent of the "true" value at the ninety-five percent confidence level are also acceptable. Where applicable, the method should also be capable of measuring formaldehyde at the action level to ± 35 percent of the "true" value with a ninety-five percent confidence level. WISHA encourages employers to choose methods that will be best for their individual needs. The employer must exercise caution, however, in choosing an appropriate method since some techniques suffer from interferences that are likely to be present in workplaces of certain industry sectors where formaldehyde is used.

(12) WISHA's analytical laboratory method.

A.C.R.O. (also use methods F.O.R.M. and F.O.R.M. 2 when applicable).

(a) Matrix: Air.

(b) Target concentration: 1 ppm (1.2 mg/m³).

(c) Procedures: Air samples are collected by drawing known volumes of air through sampling tubes containing XAD-2 adsorbent which have been coated with 2-(hydroxymethyl) piperidine. The samples are desorbed with toluene and then analyzed by gas chromatography using a nitrogen selective detector.

(d) Recommended sampling rate and air volumes: 0.1 L/min and 24 L.

(e) Reliable quantitation limit: 16 ppb (20 ug/m³).

(f) Standard error of estimate at the target concentration: 7.3%.

(g) Status of the method: A sampling and analytical method that has been subjected to the established evaluation procedures of the organic methods evaluation branch.

(h) Date: March, 1985.

(13) General discussion.

(a) Background: The current WISHA method for collecting acrolein vapor recommends the use of activated 13X molecular sieves. The samples must be stored in an ice bath during and after sampling and also they must be analyzed within forty-eight hours of collection. The current WISHA method for collecting formaldehyde vapor recommends the use of bubblers containing ten percent methanol in water as the trapping solution.

(b) This work was undertaken to resolve the sample stability problems associated with acrolein and also to eliminate the need to use bubblers to sample formaldehyde. A goal of this work was to develop and/or to evaluate a common sampling and analytical procedure for acrolein and formaldehyde.

(c) NIOSH has developed independent methodologies for acrolein and formaldehyde which recommend the use of reagent-coated adsorbent tubes to collect the aldehydes as stable derivatives. The formaldehyde sampling tubes contain Chromosorb 102 adsorbent coated with N-benzylethanolamine (BEA) which reacts with formaldehyde vapor to form a stable oxazolidine compound. The acrolein sampling tubes contain XAD-2 adsorbent coated with 2-(hydroxymethyl) piperidine (2-HMP) which reacts with acrolein vapor to form a different, stable oxazolidine derivative. Acrolein does not appear to react with BEA to give a suitable reaction product. Therefore, the formaldehyde procedure cannot provide a common method for both aldehydes. However, formaldehyde does react with 2-HMP to form a very suitable reaction product. It is the quantitative reaction of acrolein and formaldehyde with 2-HMP that provides the basis for this evaluation.

(d) This sampling and analytical procedure is very similar to the method recommended by NIOSH for acrolein. Some changes in the NIOSH methodology were necessary to permit the simultaneous determination of both aldehydes and also to accommodate WISHA laboratory equipment and analytical techniques.

(14) Limit-defining parameters: The analyte air concentrations reported in this method are based on the recommended air volume for each analyte collected separately and a desorption volume of 1 mL. The amounts are presented as acrolein and/or formaldehyde, even though the derivatives are the actual species analyzed.

(15) Detection limits of the analytical procedure: The detection limit of the analytical procedure was 386 pg per injection for formaldehyde. This was the amount of analyte which gave a peak whose height was about five times the height of the peak given by the residual formaldehyde derivative in a typical blank front section of the recommended sampling tube.

(16) Detection limits of the overall procedure: The detection limits of the overall procedure were 482 ng per sample (16 ppb or 20 ug/m³ for formaldehyde). This was the amount of analyte spiked on the sampling device which allowed recoveries approximately equal to the detection limit of the analytical procedure.

(17) Reliable quantitation limits:

(a) The reliable quantitation limit was 482 ng per sample (16 ppb or 20 ug/m³) for formaldehyde. These were the smallest amounts of analyte which could be quantitated

within the limits of a recovery of at least seventy-five percent and a precision (± 1.96 SD) of $\pm 25\%$ or better.

(b) The reliable quantitation limit and detection limits reported in the method are based upon optimization of the instrument for the smallest possible amount of analyte. When the target concentration of an analyte is exceptionally higher than these limits, they may not be attainable at the routine operating parameters.

(18) Sensitivity: The sensitivity of the analytical procedure over concentration ranges representing 0.4 to 2 times the target concentration, based on the recommended air volumes, was seven thousand five hundred eighty-nine area units per ug/mL for formaldehyde. This value was determined from the slope of the calibration curve. The sensitivity may vary with the particular instrument used in the analysis.

(19) Recovery: The recovery of formaldehyde from samples used in an eighteen-day storage test remained above ninety-two percent when the samples were stored at ambient temperature. These values were determined from regression lines which were calculated from the storage data. The recovery of the analyte from the collection device must be at least seventy-five percent following storage.

(20) Precision (analytical method only): The pooled coefficient of variation obtained from replicate determinations of analytical standards over the range of 0.4 to 2 times the target concentration was 0.0052 for formaldehyde ((d)(C)(iii) of this subsection).

(21) Precision (overall procedure): The precision at the ninety-five percent confidence level for the ambient temperature storage tests was $\pm 14.3\%$ for formaldehyde. These values each include an additional $\pm 5\%$ for sampling error. The overall procedure must provide results at the target concentrations that are $\pm 25\%$ at the ninety-five percent confidence level.

(22) Reproducibility: Samples collected from controlled test atmospheres and a draft copy of this procedure were given to a chemist unassociated with this evaluation. The formaldehyde samples were analyzed following fifteen days storage. The average recovery was 96.3% and the standard deviation was 1.7%.

(23) Advantages:

(a) The sampling and analytical procedures permit the simultaneous determination of acrolein and formaldehyde.

(b) Samples are stable following storage at ambient temperature for at least eighteen days.

(24) Disadvantages: None.

(25) Sampling procedure.

(a) Apparatus:

(i) Samples are collected by use of a personal sampling pump that can be calibrated to within $\pm 5\%$ of the recommended 0.1 L/min sampling rate with the sampling tube in line.

(ii) Samples are collected with laboratory prepared sampling tubes. The sampling tube is constructed of silane treated glass and is about 8-cm long. The ID is 4 mm and the OD is 6 mm. One end of the tube is tapered so that a glass wool end plug will hold the contents of the tube in place during sampling. The other end of the sampling tube is open to its full 4-mm ID to facilitate packing of the tube. Both ends of the tube are fire-polished for safety. The tube

is packed with a 75-mg backup section, located nearest the tapered end and a 150-mg sampling section of pretreated XAD-2 adsorbent which has been coated with 2-HMP. The two sections of coated adsorbent are separated and retained with small plugs of silanized glass wool. Following packing, the sampling tubes are sealed with two 7/32 inch OD plastic end caps. Instructions for the pretreatment and the coating of XAD-2 adsorbent are presented in (d) of this subsection.

(b) Sampling tubes, similar to those recommended in this method, are marketed by Supelco, Inc. These tubes were not available when this work was initiated; therefore, they were not evaluated.

(26) Reagents: None required.

(27) Technique:

(a) Properly label the sampling tube before sampling and then remove the plastic end caps.

(b) Attach the sampling tube to the pump using a section of flexible plastic tubing such that the large, front section of the sampling tube is exposed directly to the atmosphere. Do not place any tubing ahead of the sampling tube. The sampling tube should be attached in the worker's breathing zone in a vertical manner such that it does not impede work performance.

(c) After sampling for the appropriate time, remove the sampling tube from the pump and then seal the tube with plastic end caps.

(d) Include at least one blank for each sampling set. The blank should be handled in the same manner as the samples with the exception that air is not drawn through it.

(e) List any potential interferences on the sample data sheet.

(28) Breakthrough:

(a) Breakthrough was defined as the relative amount of analyte found on a backup sample in relation to the total amount of analyte collected on the sampling train.

(b) For formaldehyde collected from test atmospheres containing six times the PEL, the average five percent breakthrough air volume was 41 L. The sampling rate was 0.1 L/min and the average mass of formaldehyde collected was 250 ug.

(29) Desorption efficiency: No desorption efficiency corrections are necessary to compute air sample results because analytical standards are prepared using coated adsorbent. Desorption efficiencies were determined, however, to investigate the recoveries of the analytes from the sampling device. The average recovery over the range of 0.4 to 2 times the target concentration, based on the recommended air volumes, was 96.2% for formaldehyde. Desorption efficiencies were essentially constant over the ranges studied.

(30) Recommended air volume and sampling rate:

(a) The recommended air volume for formaldehyde is 24 L.

(b) The recommended sampling rate is 0.1 L/min.

(31) Interferences:

(a) Any collected substance that is capable of reacting with 2-HMP and thereby depleting the derivatizing agent is a potential interference. Chemicals which contain a carbonyl group, such as acetone, may be capable of reacting with 2-HMP.

(b) There are no other known interferences to the sampling method.

(32) Safety precautions:

(a) Attach the sampling equipment to the worker in such a manner that it will not interfere with work performance or safety.

(b) Follow all safety practices that apply to the work area being sampled.

(33) Analytical procedure.

(a) Apparatus:

(i) A gas chromatograph (GC), equipped with a nitrogen selective detector. A Hewlett-Packard model 5840A GC fitted with a nitrogen phosphorus flame ionization detector (NPD) was used for this evaluation. Injections were performed using a Hewlett-Packard model 7671A automatic sampler.

(ii) A GC column capable of resolving the analytes from any interference. A 6 ft x 1/4 in OD (2mm ID) glass GC column containing 10% UCON 50-HB-5100 + 2% KOH on 80/100 mesh Chromosorb W-AW was used for the evaluation. Injections were performed on-column.

(iii) Vials, glass 2-mL with Teflon-lined caps.

(iv) Volumetric flasks, pipets, and syringes for preparing standards, making dilutions, and performing injections.

(b) Reagents:

(i) Toluene and dimethylformamide. Burdick and Jackson solvents were used in this evaluation.

(ii) Helium, hydrogen, and air, GC grade.

(iii) Formaldehyde, thirty-seven percent by weight, in water. Aldrich Chemical, ACS Reagent Grade formaldehyde was used in this evaluation.

(iv) Amberlite XAD-2 adsorbent coated with 2-(hydroxymethyl) piperidine (2-HMP), 10% by weight ((d) of this subsection).

(v) Desorbing solution with internal standard. This solution was prepared by adding 20 uL of dimethylformamide to 100 mL of toluene.

(c) Standard preparation:

(i) Formaldehyde: Prepare stock standards by diluting known volumes of thirty-seven percent formaldehyde solution with methanol. A procedure to determine the formaldehyde content of these standards is presented in (d) of this subsection. A standard containing 7.7 mg/mL formaldehyde was prepared by diluting 1 mL of the thirty-seven percent reagent to 50 mL with methanol.

(ii) It is recommended that analytical standards be prepared about sixteen hours before the air samples are to be analyzed in order to ensure the complete reaction of the analytes with 2-HMP. However, rate studies have shown the reaction to be greater than ninety-five percent complete after four hours. Therefore, one or two standards can be analyzed after this reduced time if sample results are outside the concentration range of the prepared standards.

(iii) Place 150-mg portions of coated XAD-2 adsorbent, from the same lot number as used to collect the air samples, into each of several glass 2-mL vials. Seal each vial with a Teflon-lined cap.

(iv) Prepare fresh analytical standards each day by injecting appropriate amounts of the diluted analyte directly onto 150-mg portions of coated adsorbent. It is permissible to inject both acrolein and formaldehyde on the same

adsorbent portion. Allow the standards to stand at room temperature. A standard, approximately the target levels, was prepared by injecting 11 uL of the acrolein and 12 uL of the formaldehyde stock standards onto a single coated XAD-2 adsorbent portion.

(v) Prepare a sufficient number of standards to generate the calibration curves. Analytical standard concentrations should bracket sample concentrations. Thus, if samples are not in the concentration range of the prepared standards, additional standards must be prepared to determine detector response.

(vi) Desorb the standards in the same manner as the samples following the sixteen-hour reaction time.

(d) Sample preparation:

(i) Transfer the 150-mg section of the sampling tube to a 2-mL vial. Place the 75-mg section in a separate vial. If the glass wool plugs contain a significant number of adsorbent beads, place them with the appropriate sampling tube section. Discard the glass wool plugs if they do not contain a significant number of adsorbent beads.

(ii) Add 1 mL of desorbing solution to each vial.

(iii) Seal the vials with Teflon-lined caps and then allow them to desorb for one hour. Shake the vials by hand with vigorous force several times during the desorption time.

(iv) Save the used sampling tubes to be cleaned and recycled.

(e) Analysis:

(f) GC conditions.

(34) Column temperature:

(a) Bi-level temperature program.

(i) First level: 100°C to 140°C at 4°C/min following completion of the first level.

(ii) Second level: 140°C to 180°C at 20°C/min following completion of the first level.

(b) Isothermal period: Hold column at 180°C until the recorder pen returns to baseline (usually about twenty-five minutes after injection).

(c) Injector temperature: 180°C.

(d) Helium flow rate: 30 mL/min (detector response will be reduced if nitrogen is substituted for helium carrier gas).

(e) Injection volume: 51 0.8 uL.

(f) GC column: Six-ft x 1/4-in OD (2 mm ID) glass GC column containing 10% UCON 50-HB-5100N2G651+ 512% KOH on 80/100 Chromosorb W-AW.

(g) NPD conditions:

(i) Hydrogen flow rate: 3 mL/min.

(ii) Air flow rate: 50 mL/min.

(h) Detector temperature: 275 5151C.

(i) Use a suitable method, such as electronic integration, to measure detector response.

(ii) Use an internal standard method to prepare the calibration curve with several standard solutions of different concentrations. Prepare the calibration curve daily. Program the integrator to report results in ug/mL.

(iii) Bracket sample concentrations with standards.

(iv) Interferences (analytical).

(A) Any compound with the same general retention time as the analytes and which also gives a detector response is a potential interference. Possible interferences should be

reported to the laboratory with submitted samples by the industrial hygienist.

(B) GC parameters (temperature, column, etc.), may be changed to circumvent interferences.

(C) A useful means of structure designation is GC/MS. It is recommended this procedure be used to confirm samples whenever possible.

(D) The coated adsorbent usually contains a very small amount of residual formaldehyde derivative.

(i) Calculations:

(i) Results are obtained by use of calibration curves. Calibration curves are prepared by plotting detector response against concentration for each standard. The best line through the data points is determined by curve fitting.

(ii) The concentration, in ug/mL, for a particular sample is determined by comparing its detector response to the calibration curve. If either of the analytes is found on the backup section, it is added to the amount found on the front section. Blank corrections should be performed before adding the results together.

(iii) The acrolein and/or formaldehyde air concentration can be expressed using the following equation:

$$\text{Mg/m}^3 = (\text{A})(\text{B})/\text{C}$$

where A=ug/mL from 3.7.2, B=desorption volume, and C=L of air sampled.

No desorption efficiency corrections are required.

(iv) The following equation can be used to convert results in mg/m³ to ppm.

$$\text{ppm} = (\text{mg/m}^3)(24.45)/\text{MW}$$

where mg/m³=result from 3.7.3, 24.45=molar volume of an ideal gas at 760 mm Hg and 25 5151C, MW=molecular weight (Formaldehyde=30.0).

(j) Backup data. Backup data on detection limits, reliable quantitation limits, sensitivity and precision of the analytical method, breakthrough, desorption efficiency, storage, reproducibility, and generation of test atmospheres are available in OSHA Method 52, developed by the Organics Methods Evaluation Branch, OSHA Analytical Laboratory, Salt Lake City, Utah.

(k) Procedure to coat XAD-2 adsorbent with 2-HMP:

(i) Apparatus: Soxhlet extraction apparatus, rotary evaporation apparatus, vacuum dessicator, 1-L vacuum flask, 1-L round-bottomed evaporative flask, 1-L Erlenmeyer flask, 250-mL Buchner funnel with a coarse fritted disc, etc.

(ii) Reagents:

(A) Methanol, isooctane, and toluene.

(B) (Hydroxymethyl) piperidine.

(C) Amberlite XAD-2 nonionic polymeric adsorbent, twenty to sixty mesh, Aldrich Chemical XAD-2 was used in this evaluation.

(l) Procedure: Weigh 125 g of crude XAD-2 adsorbent into a 1-L Erlenmeyer flask. Add about 200 mL of water to the flask and then swirl the mixture to wash the adsorbent. Discard any adsorbent that floats to the top of the water and then filter the mixture using a fritted Buchner funnel. Air dry the adsorbent for two minutes. Transfer the adsorbent back to the Erlenmeyer flask and then add about 200 mL of methanol to the flask. Swirl and then filter the mixture as before. Transfer the washed adsorbent back to the Erlenmeyer flask and then add about 200 mL of methanol to the flask. Swirl and then filter the mixture as before. Transfer

the washed adsorbent to a 1-L round-bottomed evaporative flask, add 13 g of 2-HMP and then 200 mL of methanol, swirl the mixture and then allow it to stand for one hour. Remove the methanol at about 40°C and reduced pressure using a rotary evaporation apparatus. Transfer the coated adsorbent to a suitable container and store it in a vacuum desiccator at room temperature overnight. Transfer the coated adsorbent to a Soxhlet extractor and then extract the material with toluene for about twenty-four hours. Discard the contaminated toluene, add methanol in its place and then continue the Soxhlet extraction for an additional four hours. Transfer the adsorbent to a weighted 1-L round-bottom evaporative flask and remove the methanol using the rotary evaporation apparatus. Determine the weight of the adsorbent and then add an amount of 2-HMP, which is ten percent by weight of the adsorbent. Add 200 mL of methanol and then swirl the mixture. Allow the mixture to stand for one hour. Remove the methanol by rotary evaporation. Transfer the coated adsorbent to a suitable container and store it in a vacuum desiccator until all traces of solvents are gone. Typically, this will take two to three days. The coated adsorbent should be protected from contamination. XAD-2 adsorbent treated in this manner will probably not contain residual acrolein derivative. However, this adsorbent will often contain residual formaldehyde derivative levels of about 0.1 ug per 150 mg of adsorbent. If the blank values for a batch of coated adsorbent are too high, then the batch should be returned to the Soxhlet extractor, extracted with toluene again and then recoated. This process can be repeated until the desired blank levels are attained.

The coated adsorbent is now ready to be packed into sampling tubes. The sampling tubes should be stored in a sealed container to prevent contamination. Sampling tubes should be stored in the dark at room temperature. The sampling tubes should be segregated by coated adsorbent lot number. A sufficient amount of each lot number of coated adsorbent should be retained to prepare analytical standards for use with air samples from that lot number.

(m) A procedure to determine formaldehyde by acid titration:

(i) Standardize the 0.1 N HCl solution using sodium carbonate and methyl orange indicator.

(ii) Place 50 mL of 0.1 M sodium sulfite and three drops of thymolphthalein indicator into a 250-mL Erlenmeyer flask. Titrate the contents of the flask to a colorless endpoint with 0.1 N HCl (usually one or two drops is sufficient). Transfer 10 mL of the formaldehyde/methanol solution ((b)(iii)(A) of this subsection) into the same flask and titrate the mixture with 0.1 N HCl, again, to a colorless endpoint. The formaldehyde concentration of the standard may be calculated by the following equation:

$$\text{Formaldehyde, mg/mL} = \frac{\text{acid titer} \times \text{acid normality} \times 30.0}{\text{mL of Sample}}$$

(iii) This method is based on the quantitative liberation of sodium hydroxide when formaldehyde reacts with sodium sulfite to form the formaldehyde-bisulfite addition product. The volume of sample may be varied depending on the formaldehyde content but the solution to be titrated must

contain excess sodium sulfite. Formaldehyde solutions containing substantial amounts of acid or base must be neutralized before analysis.

[Statutory Authority: Chapter 49.17 RCW. 91-11-070 (Order 91-01), § 296-62-07544, filed 5/20/91, effective 6/20/91; 90-03-029 (Order 89-20), § 296-62-07544, filed 1/11/90, effective 2/26/90; 89-11-035 (Order 89-03), § 296-62-07544, filed 5/15/89, effective 6/30/89; 88-21-002 (Order 88-23), § 296-62-07544, filed 10/6/88, effective 11/7/88.]

WAC 296-62-07546 Appendix C medical surveillance—Formaldehyde. (1) Health hazards. The occupational health hazards of formaldehyde are primarily due to its toxic effects after inhalation, after direct contact with the skin or eyes by formaldehyde in liquid or vapor form, and after ingestion.

(2) Toxicology.

(a) Acute effects of exposure.

(i) Inhalation (breathing): Formaldehyde is highly irritating to the upper airways. The concentration of formaldehyde that is immediately dangerous to life and health is 100 ppm. Concentrations above 50 ppm can cause severe pulmonary reactions within minutes. These include pulmonary edema, pneumonia, and bronchial irritation which can result in death. Concentrations above 5 ppm readily cause lower airway irritation characterized by cough, chest tightness, and wheezing. There is some controversy regarding whether formaldehyde gas is a pulmonary sensitizer which can cause occupational asthma in a previously normal individual. Formaldehyde can produce symptoms of bronchial asthma in humans. The mechanism may be either sensitization of the individual by exposure to formaldehyde or direct irritation by formaldehyde in persons with preexisting asthma. Upper airway irritation is the most common respiratory effect reported by workers and can occur over a wide range of concentrations, most frequently above 1 ppm. However, airway irritation has occurred in some workers with exposures to formaldehyde as low as 0.1 ppm. Symptoms of upper airway irritation include dry or sore throat, itching and burning sensations of the nose, and nasal congestion. Tolerance to this level of exposure may develop within one to two hours. This tolerance can permit workers remaining in an environment of gradually increasing formaldehyde concentrations to be unaware of their increasingly hazardous exposure.

(ii) Eye contact: Concentrations of formaldehyde between 0.05 ppm and 0.5 ppm produce a sensation of irritation in the eyes with burning, itching, redness, and tearing. Increased rate of blinking and eye closure generally protects the eye from damage at these low levels, but these protective mechanisms may interfere with some workers' work abilities. Tolerance can occur in workers continuously exposed to concentrations of formaldehyde in this range. Accidental splash injuries of human eyes to aqueous solutions of formaldehyde (formalin) have resulted in a wide range of ocular injuries including corneal opacities and blindness. The severity of the reactions have been directly dependent on the concentration of formaldehyde in solution and the amount of time lapsed before emergency and medical intervention.

(iii) Skin contact: Exposure to formaldehyde solutions can cause irritation of the skin and allergic contact dermati-

tis. These skin diseases and disorders can occur at levels well below those encountered by many formaldehyde workers. Symptoms include erythema, edema, and vesiculation or hives. Exposure to liquid formalin or formaldehyde vapor can provoke skin reactions in sensitized individuals even when airborne concentrations of formaldehyde are well below 1 ppm.

(iv) Ingestion: Ingestion of as little as 30 ml of a thirty-seven percent solution of formaldehyde (formalin) can result in death. Gastrointestinal toxicity after ingestion is most severe in the stomach and results in symptoms which can include nausea, vomiting, and severe abdominal pain. Diverse damage to other organ systems including the liver, kidney, spleen, pancreas, brain, and central nervous systems can occur from the acute response to ingestion of formaldehyde.

(b) Chronic effects of exposure. Long-term exposure to formaldehyde has been shown to be associated with an increased risk of cancer of the nose and accessory sinuses, nasopharyngeal and oropharyngeal cancer, and lung cancer in humans. Animal experiments provide conclusive evidence of a causal relationship between nasal cancer in rats and formaldehyde exposure. Concordant evidence of carcinogenicity includes DNA binding, genotoxicity in short-term tests, and cytotoxic changes in the cells of the target organ suggesting both preneoplastic changes and a dose-rate effect. Formaldehyde is a complete carcinogen and appears to exert an effect on at least two stages of the carcinogenic process.

(3) Surveillance considerations.

(a) History.

(i) Medical and occupational history: Along with its acute irritative effects, formaldehyde can cause allergic sensitization and cancer. One of the goals of the work history should be to elicit information on any prior or additional exposure to formaldehyde in either the occupational or the nonoccupational setting.

(ii) Respiratory history: As noted above, formaldehyde has recognized properties as an airway irritant and has been reported by some authors as a cause of occupational asthma. In addition, formaldehyde has been associated with cancer of the entire respiratory system of humans. For these reasons, it is appropriate to include a comprehensive review of the respiratory system in the medical history. Components of this history might include questions regarding dyspnea on exertion, shortness of breath, chronic airway complaints, hyperreactive airway disease, rhinitis, bronchitis, bronchiolitis, asthma, emphysema, respiratory allergic reaction, or other preexisting pulmonary disease.

In addition, generalized airway hypersensitivity can result from exposures to a single sensitizing agent. The examiner should, therefore, elicit any prior history of exposure to pulmonary irritants, and any short-term or long-term effects of that exposure.

Smoking is known to decrease mucociliary clearance of materials deposited during respiration in the nose and upper airways. This may increase a worker's exposure to inhaled materials such as formaldehyde vapor. In addition, smoking is a potential confounding factor in the investigation of any chronic respiratory disease, including cancer. For these reasons, a complete smoking history should be obtained.

(iii) Skin disorders: Because of the dermal irritant and sensitizing effects of formaldehyde, a history of skin disorders should be obtained. Such a history might include the existence of skin irritation, previously documented skin sensitivity, and other dermatologic disorders. Previous exposure to formaldehyde and other dermal sensitizers should be recorded.

(iv) History of atopic or allergic diseases: Since formaldehyde can cause allergic sensitization of the skin and airways, it might be useful to identify individuals with prior allergen sensitization. A history of atopic disease and allergies to formaldehyde or any other substances should also be obtained. It is not definitely known at this time whether atopic diseases and allergies to formaldehyde or any other substances should also be obtained. Also it is not definitely known at this time whether atopic individuals have a greater propensity to develop formaldehyde sensitivity than the general population, but identification of these individuals may be useful for ongoing surveillance.

(v) Use of disease questionnaires: Comparison of the results from previous years with present results provides the best method for detecting a general deterioration in health when toxic signs and symptoms are measured subjectively. In this way recall bias does not affect the results of the analysis. Consequently, WISHA has determined that the findings of the medical and work histories should be kept in a standardized form for comparison of the year-to-year results.

(b) Physical examination.

(i) Mucosa of eyes and airways: Because of the irritant effects of formaldehyde, the examining physician should be alert to evidence of this irritation. A speculum examination of the nasal mucosa may be helpful in assessing possible irritation and cytotoxic changes, as may be indirect inspection of the posterior pharynx by mirror.

(ii) Pulmonary system: A conventional respiratory examination, including inspection of the thorax and auscultation and percussion of the lung fields should be performed as part of the periodic medical examination. Although routine pulmonary function testing is only required by the standard once every year for persons who are exposed over the TWA concentration limit, these tests have an obvious value in investigating possible respiratory dysfunction and should be used wherever deemed appropriate by the physician. In cases of alleged formaldehyde-induced airway disease, other possible causes of pulmonary dysfunction (including exposures to other substances) should be ruled out. A chest radiograph may be useful in these circumstances. In cases of suspected airway hypersensitivity or allergy, it may be appropriate to use bronchial challenge testing with formaldehyde or methacholine to determine the nature of the disorder. Such testing should be performed by or under the supervision of a physician experienced in the procedures involved.

(iii) Skin: The physician should be alert to evidence of dermal irritation of sensitization, including reddening and inflammation, urticaria, blistering, scaling, formation of skin fissures, or other symptoms. Since the integrity of the skin barrier is compromised by other dermal diseases, the presence of such disease should be noted. Skin sensitivity testing carries with it some risk of inducing sensitivity, and

therefore, skin testing for formaldehyde sensitivity should not be used as a routine screening test. Sensitivity testing may be indicated in the investigation of a suspected existing sensitivity. Guidelines for such testing have been prepared by the North American Contact Dermatitis Group.

(4) Additional examinations or tests. The physician may deem it necessary to perform other medical examinations or tests as indicated. The standard provides a mechanism whereby these additional investigations are covered under the standard for occupational exposure to formaldehyde.

(5) Emergencies. The examination of workers exposed in an emergency should be directed at the organ systems most likely to be affected. Much of the content of the examination will be similar to the periodic examination unless the patient has received a severe acute exposure requiring immediate attention to prevent serious consequences. If a severe overexposure requiring medical intervention or hospitalization has occurred, the physician must be alert to the possibility of delayed symptoms. Followup nonroutine examinations may be necessary to assure the patient's well-being.

(6) Employer obligations. The employer is required to provide the physician with the following information: A copy of this standard and appendices A, C, D, and E; a description of the affected employee's duties as they relate to his or her exposure concentration; an estimate of the employee's exposure including duration (e.g., fifteen hr/wk., three eight-hour shifts, full-time); a description of any personal protective equipment, including respirators, used by the employee; and the results of any previous medical determinations for the affected employee related to formaldehyde exposure to the extent that this information is within the employer's control.

(7) Physician's obligations. The standard requires the employer to obtain a written statement from the physician. This statement must contain the physician's opinion as to whether the employee has any medical condition which would place him or her at increased risk of impaired health from exposure to formaldehyde or use of respirators, as appropriate. The physician must also state his opinion regarding any restrictions that should be placed on the employee's exposure to formaldehyde or upon the use of protective clothing or equipment such as respirators. If the employee wears a respirator as a result of his or her exposure to formaldehyde, the physician's opinion must also contain a statement regarding the suitability of the employee to wear the type of respirator assigned. Finally, the physician must inform the employer that the employee has been told the results of the medical examination and of any medical conditions which require further explanation or treatment. This written opinion is not to contain any information on specific findings or diagnoses unrelated to occupational exposure to formaldehyde.

The purpose in requiring the examining physician to supply the employer with a written opinion is to provide the employer with a medical basis to assist the employer in placing employees initially, in assuring that their health is not being impaired by formaldehyde, and to assess the employee's ability to use any required protective equipment.

[Statutory Authority: Chapter 49.17 RCW. 88-21-002 (Order 88-23), § 296-62-07546, filed 10/6/88, effective 11/7/88.]

(1997 Ed.)

WAC 296-62-07548 Appendix D—Nonmandatory medical disease questionnaire. (1) Identification.

- (a) Plant name:
 - (b) Date:
 - (c) Employee name:
 - (d) Social Security number:
 - (e) Job title:
 - (f) Birthdate:
 - (g) Age:
 - (h) Sex:
 - (i) Height:
 - (j) Weight:
- (2) Medical history.
- (a) Have you ever been in the hospital as a patient?
Yes No
If yes, what kind of problem were you having?

- (b) Have you ever had any kind of operation?
Yes No
If yes, what kind?

- (c) Do you take any kind of medicine regularly?
Yes No
If yes, what kind?

- (d) Are you allergic to any drugs, foods, or chemicals?
Yes No
If yes, what kind of allergy is it?

What causes the allergy?

- (e) Have you ever been told that you have asthma, hayfever, or sinusitis?
Yes No
- (f) Have you ever been told that you have emphysema, bronchitis, or any other respiratory problems?
Yes No
- (g) Have you ever been told you had hepatitis?
Yes No
- (h) Have you ever been told that you have cirrhosis?
Yes No
- (i) Have you ever been told that you had cancer?
Yes No
- (j) Have you ever had arthritis or joint pain?
Yes No
- (k) Have you ever been told that you had high blood pressure?
Yes No
- (l) Have you ever had a heart attack or heart trouble?
Yes No

- (3) Medical history update.
- (a) Have you been in the hospital as a patient any time within the past year?
Yes No
If so, for what condition?
- (b) Have you been under the care of a physician during the past year?
Yes No
If so, for what condition?
- (c) Is there any change in your breathing since last year?
Yes No
(i) Better?
(ii) Worse?
(iii) No change?
If change, do you know why?
- (d) Is your general health different this year from last year?
Yes No
If different, in what way?
- (e) Have you in the past year or are you now taking any medication on a regular basis?
Yes No
(i) Name Rx
(ii) Condition being treated
- (4) Occupational history.
- (a) How long have you worked for your present employer?
- (b) What jobs have you held with this employer? Include job title and length of time in each job.
- (c) In each of these jobs, how many hours a day were you exposed to chemicals?
- (d) What chemicals have you worked with most of the time?
- (e) Have you ever noticed any type of skin rash you feel was related to your work?
Yes No
- (f) Have you ever noticed that any kind of chemical makes you cough?
Yes No
- (i) Wheeze:
Yes No
- (ii) Become short of breath or cause your chest to become tight?
Yes No
- (g) Are you exposed to any dust or chemicals at home?
Yes No
If yes, explain:
- (h) In other jobs, have you ever had exposure to:
- (i) Wood dust?
Yes No
- (ii) Nickel or chromium?
Yes No
- (iii) Silica (foundry, sand blasting)?
Yes No
- (iv) Arsenic or asbestos?
Yes No
- (v) Organic solvents?
Yes No
- (vi) Urethane foams?
Yes No
- (5) Occupational history update.
- (a) Are you working on the same job this year as you were last year?
Yes No
If not, how has your job changed?
- (b) What chemicals are you exposed to on your job?
- (c) How many hours a day are you exposed to chemicals?
- (d) Have you noticed any skin rash within the past year you feel was related to your work?
Yes No
If so, explain circumstances:
- (e) Have you noticed that any chemical makes you cough, be short of breath, or wheeze?
Yes No
If so, can you identify it?
- (6) Miscellaneous.
- (a) Do you smoke?
Yes No
If so, how much and for how long?
(i) Pipe
(ii) Cigars
(iii) Cigarettes
- (b) Do you drink alcohol in any form?
Yes No

- If so, how much, how long, and how often?
- (c) Do you wear glasses or contact lenses?
Yes No
- (d) Do you get any physical exercise other than that required to do your job?
Yes No
If so, explain:
- (e) Do you have any hobbies or "side jobs" that require you to use chemicals, such as furniture stripping, sand blasting, insulation or manufacture of urethane foam, furniture, etc.?
Yes No
If so, please describe, giving type of business or hobby, chemicals used and length of exposures.
- (7) Symptoms questionnaire.
- (a) Do you ever have any shortness of breath?
Yes No
- (i) If yes, do you have to rest after climbing several flights of stairs?
Yes No
- (ii) If yes, if you walk on the level with people your own age, do you walk slower than they do?
Yes No
- (iii) If yes, if you walk slower than a normal pace, do you have to limit the distance that you walk?
Yes No
- (iv) If yes, do you have to stop and rest while bathing or dressing?
Yes No
- (b) Do you cough as much as three months out of the year?
Yes No
- (i) If yes, have you had this cough for more than two years?
Yes No
- (ii) If yes, do you ever cough anything up from the chest?
Yes No
- (c) Do you ever have a feeling of smothering, unable to take a deep breath, or tightness in your chest?
Yes No
- (i) If yes, do you notice that this occurs on any particular day of the week?
Yes No
- (ii) If yes, what day of the week?
- (iii) If yes, do you notice that this occurs at any particular place?
Yes No
- (iv) If yes, do you notice that this is worse after you have returned to work after being off for several days?
Yes No
- (d) Have you ever noticed any wheezing in your chest?
Yes No
- (i) If yes, is this only with colds or other infections?
Yes No
- (ii) Is this caused by exposure to any kind of dust or other material?
Yes No
- (iii) If yes, what kind?
- (e) Have you noticed any burning, tearing, or redness of your eyes when you are at work?
Yes No
If so, explain circumstances:
- (f) Have you noticed any sore or burning throat or itchy or burning nose when you are at work?
Yes No
If so, explain circumstances:
- (g) Have you noticed any stuffiness or dryness of your nose?
Yes No
- (h) Do you ever have swelling of the eyelids or face?
Yes No
- (i) Have you ever been jaundiced?
Yes No
If yes, was this accompanied by any pain?
Yes No
- (j) Have you ever had a tendency to bruise easily or bleed excessively?
Yes No
- (k) Do you have frequent headaches that are not relieved by aspirin or tylenol?
Yes No
- (i) If yes, do they occur at any particular time of the day or week?
Yes No
- (ii) If yes, when do they occur?
- (l) Do you have frequent episodes of nervousness or irritability?
Yes No

- (m) Do you tend to have trouble concentrating or remembering?
Yes No
- (n) Do you ever feel dizzy, light-headed, excessively drowsy, or like you have been drugged?
Yes No
- (o) Does your vision ever become blurred?
Yes No
- (p) Do you have numbness or tingling of the hands or feet or other parts of your body?
Yes No
- (q) Have you ever had chronic weakness or fatigue?
Yes No
- (r) Have you every had any swelling of your feet or ankles to the point where you could not wear your shoes?
Yes No
- (s) Are you bothered by heartburn or indigestion?
Yes No
- (t) Do you ever have itching, dryness, or peeling and scaling of the hands?
Yes No
- (u) Do you ever have a burning sensation in the hands, or reddening of the skin?
Yes No
- (v) Do you ever have cracking or bleeding of the skin on your hands?
Yes No
- (w) Are you under a physician's care?
Yes No
If yes, for what are you being treated?
- (x) Do you have any physical complaints today?
Yes No
If yes, explain:
- (y) Do you have other health conditions not covered by these questions?
Yes No
If yes, explain:

[Statutory Authority: Chapter 49.17 RCW, 88-21-002 (Order 88-23), § 296-62-07548, filed 10/6/88, effective 11/7/88.]

WAC 296-62-07550 Appendix E—Qualitative and quantitative fit testing procedures. FIT test protocols. Because exposure to formaldehyde can affect the employee's ability to detect common odorants, fit test results from the isoamyl acetate test must be augmented by results from either the saccharin or irritant smoke test.

(1) The employer shall include the following provisions in the fit test procedures. These provisions apply to both qualitative fit testing (QLFT) and quantitative fit testing (QNFT).

(a) The test subject shall be allowed to pick the most comfortable respirator from a selection including respirators of various sizes from different manufacturers. The selection shall include at least three sizes of elastomeric facepieces of the type of respirator that is to be tested, i.e., three sizes of half mask; or three sizes of full facepiece; and units from at least two manufacturers.

(b) Prior to the selection process, the test subject shall be shown how to put on a respirator, how it should be positioned on the face, how to set strap tension and how to determine a comfortable fit. A mirror shall be available to assist the subject in evaluating the fit and positioning the respirator. This instruction may not constitute the subject's formal training on respirator use, as it is only a review.

(c) The test subject shall be informed that he/she is being asked to select the respirator which provides the most comfortable fit. Each respirator represents a different size and shape, and if fitted and used properly, will provide adequate protection.

(d) The test subject shall be instructed to hold each facepiece up to the face and eliminate those which obviously do not give a comfortable fit.

(e) The more comfortable facepieces are noted; the most comfortable mask is donned and worn at least five minutes to assess comfort. Assistance in assessing comfort can be given by discussing the points in (f) of this subsection. If the test subject is not familiar with using a particular respirator, the test subject shall be directed to don the mask several times and to adjust the straps each time to become adept at setting proper tension on the straps.

(f) Assessment of comfort shall include reviewing the following points with the test subject and allowing the test subject adequate time to determine the comfort of the respirator:

- (i) Position of the mask on the nose;
- (ii) Room for eye protection;
- (iii) Room to talk;
- (iv) Position of mask on face and cheeks.

(g) The following criteria shall be used to help determine the adequacy of the respirator fit:

- (i) Chin properly placed;
- (ii) Adequate strap tension, not overly tightened;
- (iii) Fit across nose bridge;
- (iv) Respirator of proper size to span distance from nose to chin;

(v) Tendency of respirator to slip;

(vi) Self-observation in mirror to evaluate fit and respirator position.

(h) The test subject shall conduct the negative and positive pressure fit checks as described below or in the latest edition of ANSI Z88.2. Before conducting the negative or positive pressure test, the subject shall be told to seat the mask on the face by moving the head from side to side and up and down slowly while taking in a few slow deep breaths. Another facepiece shall be selected and retested if the test subject fails the fit check tests.

(i) Positive pressure test. Close off the exhalation valve and exhale gently onto the facepiece. The face fit is considered satisfactory if a slight positive pressure can be built up inside the facepiece without any evidence of outward leakage of air at the seal. For most respirators this

method of leak testing requires the wearer to first remove the exhalation valve cover before closing off the exhalation valve and then carefully replacing it after the test.

(ii) Negative pressure test. Close off the inlet opening of the canister or cartridge(s) by covering with the palm of the hand(s) or by replacing the filter seal(s), inhale gently so that the facepiece collapses slightly, and hold the breath for ten seconds. If the facepiece remains in its slightly collapsed condition and no inward leakage of air is detected, the tightness of the respirator is considered satisfactory.

(i) The test shall not be conducted if there is any hair growth between the skin and the facepiece sealing surface, such as stubble beard growth, beard, or long sideburns which cross the respirator sealing surface. Any type of apparel which interferes with a satisfactory fit shall be altered or removed.

(j) If a test subject exhibits difficulty in breathing during the tests, she or he shall be referred to a physician trained in respiratory disease or pulmonary medicine to determine whether the test subject can wear a respirator while performing her or his duties.

(k) The test subject shall be given the opportunity to wear the successfully fitted respirator for a period of two weeks. If at any time during this period the respirator becomes uncomfortable, the test subject shall be given the opportunity to select a different facepiece and to be retested.

(l) The employer shall certify that a successful fit test has been administered to the employee. The certification shall include the following information:

- (i) Name of employee;
- (ii) Type, brand, and size of respirator; and
- (iii) Date of test.

Where QNFT is used, the fit factor, strip chart, or other recording of the results of the test, shall be retained with the certification. The certification shall be maintained until the next fit test is administered.

(m) Exercise regimen. Prior to the commencement of the fit test, the test subject shall be given a description of the fit test and the test subject's responsibilities during the test procedure.

The description of the process shall include a description of the test exercises that the subject will be performing. The respirator to be tested shall be worn for at least five minutes before the start of the fit test.

(n) Test exercises. The test subject shall perform exercises, in the test environment, in the manner described below:

(i) Normal breathing. In a normal standing position, without talking, the subject shall breathe normally.

(ii) Deep breathing. In a normal standing position, the subject shall breathe slowly and deeply, taking caution so as to not hyperventilate.

(iii) Turning head side to side. Standing in place, the subject shall slowly turn his/her head from side to side between the extreme positions on each side. The head shall be held at each extreme momentarily so the subject can inhale at each side.

(iv) Moving head up and down. Standing in place, the subject shall slowly move his/her head up and down. The subject shall be instructed to inhale in the up position (i.e., when looking toward the ceiling).

(v) Talking. The subject shall talk out loud slowly and loudly enough so as to be heard clearly by the test conductor. The subject can read from a prepared text such as the Rainbow Passage, count backward from one hundred, or recite a memorized poem or song.

(vi) Grimace. The test subject shall grimace by smiling or frowning.

(vii) Bending over. The test subject shall bend at the waist as if he/she were to touch his/her toes. Jogging in place shall be substituted for this exercise in those test environments such as shroud type QNFT units which prohibit bending at the waist.

(viii) Normal breathing. Same as (n)(i) of this subsection.

(A) Each test exercise shall be performed for one minute except for the grimace exercise which shall be performed for fifteen seconds.

(B) The test subject shall be questioned by the test conductor regarding the comfort of the respirator upon completion of the protocol. If it has become uncomfortable, another model of respirator shall be tried.

(2) Qualitative fit test (QLFT) protocols.

(a) General.

(i) The employer shall assign specific individuals who shall assume full responsibility for implementing the respirator qualitative fit test program.

(ii) The employer shall ensure that persons administering QLFT are able to prepare test solutions, calibrate equipment and perform tests properly, recognize invalid tests, and assure that the equipment is in proper working order.

(iii) The employer shall assure the QLFT equipment is kept clean and well maintained so as to operate at the parameters for which it was designed.

(b) Isoamyl acetate protocol.

(i) Odor threshold screening. The odor threshold screening test, performed without wearing a respirator, is intended to determine if the individual tested can detect the odor of isoamyl acetate.

(A) Three one-liter glass jars with metal lids are required.

(B) Odor-free water (e.g., distilled or spring water) at approximately 25°C shall be used for the solutions.

(C) The isoamyl acetate (IAA) (also known as isopentyl acetate) stock solution is prepared by adding 1 cc of pure IAA to 800 cc of odor-free water in a one-liter jar and shaking for thirty seconds. A new solution shall be prepared at least weekly.

(D) The screening test shall be conducted in a room separate from the room used for actual fit testing. The two rooms shall be well ventilated but shall not be connected to the same recirculating ventilation system.

(E) The odor test solution is prepared in a second jar by placing 0.4 cc of the stock solution into 500 cc of odor-free water using a clear dropper or pipette. The solution shall be shaken for thirty seconds and allowed to stand for two to three minutes so that the IAA concentration above the liquid may reach equilibrium. This solution shall be used for only one day.

(F) A test blank shall be prepared in a third jar by adding 500 cc of odor-free water.

(G) The odor test and test blank jars shall be labeled 1 and 2 for jar identification. Labels shall be placed on the lids so they can be periodically peeled, dried off and switched to maintain the integrity of the test.

(H) The following instruction shall be typed on a card and placed on the table in front of the two jars (i.e., 1 and 2): "The purpose of this test is to determine if you can smell banana oil at a low concentration. The two bottles in front of you contain water. One of these bottles also contain a small amount of banana oil. Be sure the covers are on tight, then shake each bottle for two seconds. Unscrew the lid of each bottle, one at a time, and sniff at the mouth of the bottle. Indicate to the test conductor which bottle contains banana oil."

(I) The mixtures used in the IAA odor detection test shall be prepared in an area separate from where the test is performed, in order to prevent olfactory fatigue in the subject.

(J) If the test subject is unable to correctly identify the jar containing the odor test solution, the IAA qualitative fit test shall not be performed.

(K) If the test subject correctly identifies the jar containing the odor test solution, the test subject may proceed to respirator selection and fit testing.

(ii) Isoamyl acetate fit test.

(A) The fit test chamber shall be similar to a clear fifty-five gallon drum liner suspended inverted over a two-foot diameter frame so that the top of the chamber is about six inches above the test subject's head. The inside top center of the chamber shall have a small hook attached.

(B) Each respirator used for the fitting and fit testing shall be equipped with organic vapor cartridges or offer protection against organic vapors. The cartridges or masks shall be changed at least weekly.

(C) After selecting, donning, and properly adjusting a respirator, the test subject shall wear it to the fit testing room. This room shall be separate from the room used for odor threshold screening and respirator selection, and shall be well ventilated, as by an exhaust fan or lab hood, to prevent general room contamination.

(D) A copy of the test exercises and any prepared text from which the subject is to read shall be taped to the inside of the test chamber.

(E) Upon entering the test chamber, the test subject shall be given a six-inch by five-inch piece of paper towel, or other porous, absorbent, single-ply material, folded in half, and wetted with 0.75 cc of pure IAA. The test subject shall hang the wet towel on the hook at the top of the chamber.

(F) Allow two minutes for the IAA test concentration to stabilize before starting the fit test exercises. This would be an appropriate time to talk with the test subject; to explain the fit test, the importance of his/her cooperation, and the purpose for the head exercises; or to demonstrate some of the exercises.

(G) If at any time during the test, the subject detects the bananalike odor of IAA, the test has failed. The subject shall quickly exit from the test chamber and leave the test area to avoid olfactory fatigue.

(H) If the test has failed, the subject shall return to the selection room and remove the respirator, repeat the odor sensitivity test, select and put on another respirator, return to

the test chamber and again begin the procedure described in (b)(ii)(A) through (G) of this subsection. The process continues until a respirator that fits well has been found. Should the odor sensitivity test be failed, the subject shall wait about five minutes before retesting. Odor sensitivity will usually have returned by this time.

(I) When a respirator is found that passes the test, its efficiency shall be demonstrated for the subject by having the subject break the face seal and take a breath before exiting the chamber.

(J) When the test subject leaves the chamber, the subject shall remove the saturated towel and return it to the person conducting the test. To keep the test area from becoming contaminated, the used towels shall be kept in a self-sealing bag so there is no significant IAA concentration build-up in the test chamber during subsequent tests.

(c) Saccharin solution aerosol protocol. The saccharin solution aerosol QLFT protocol is the only currently available, validated test protocol for use with particulate disposable dust respirators not equipped with high-efficiency filters. The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

(i) Taste threshold screening. The saccharin taste threshold screening, performed without wearing a respirator, is intended to determine whether the individual being tested can detect the taste of saccharin.

(A) Threshold screening as well as fit testing subjects shall wear an enclosure about the head and shoulders that is approximately twelve inches in diameter by fourteen inches tall with at least the front portion clear and that allows free movements of the head when a respirator is worn. An enclosure substantially similar to the 3M hood assembly, parts NZ FT 14 and NZ FT 15 combined, is adequate.

(B) The test enclosure shall have a three-quarter inch hole in front of the test subject's nose and mouth area to accommodate the nebulizer nozzle.

(C) The test subject shall don the test enclosure. Throughout the threshold screening test, the test subject shall breathe through his/her wide open mouth with tongue extended.

(D) Using a DeVilbiss Model 40 Inhalation Medication Nebulizer the test conductor shall spray the threshold check solution into the enclosure. This nebulizer shall be clearly marked to distinguish it from the fit test solution nebulizer.

(E) The threshold check solution consists of 0.83 grams of sodium saccharin USP in 100 cc of warm water. It can be prepared by putting 1 cc of the fit test solution (see (c)(ii)(E) of this subsection) in 100 cc of distilled water.

(F) To produce the aerosol, the nebulizer bulb is firmly squeezed so that it collapses completely, then released and allowed to fully expand.

(G) Ten squeezes are repeated rapidly and then the test subject is asked whether the saccharin can be tasted.

(H) If the first response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the saccharin is tasted.

(I) If the second response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the saccharin is tasted.

(J) The test conductor will take note of the number of squeezes required to solicit a taste response.

(K) If the saccharin is not tasted after thirty squeezes, the test subject may not perform the saccharin fit test.

(L) If a taste response is elicited, the test subject shall be asked to take note of the taste for reference in the fit test.

(M) Correct use of the nebulizer means that approximately 1 cc of liquid is used at a time in the nebulizer body.

(N) The nebulizer shall be thoroughly rinsed in water, shaken dry, and refilled at least each morning and afternoon or at least every four hours.

(ii) Saccharin solution aerosol fit test procedure.

(A) The test subject may not eat, drink (except plain water), or chew gum for fifteen minutes before the test.

(B) The fit test uses the same enclosure described in (c)(i) of this subsection.

(C) The test subject shall don the enclosure while wearing the respirator selected in (c)(i) of this subsection. The respirator shall be properly adjusted and equipped with a particular filter(s).

(D) A second DeVilbiss Model 40 Inhalation Medication Nebulizer is used to spray the fit test solution into the enclosure. This nebulizer shall be clearly marked to distinguish it from the screening test solution nebulizer.

(E) The fit test solution is prepared by adding eighty-three grams of sodium saccharin to 100 cc of warm water.

(F) As before, the test subject shall breathe through the open mouth with tongue extended.

(G) The nebulizer is inserted into the hole in the front of the enclosure and the fit test solution is sprayed into the enclosure using the same number of squeezes required to elicit a taste response in the screening test.

(H) After generating the aerosol the test subject shall be instructed to perform the exercises in subsection (1)(n) of this section.

(I) Every thirty seconds the aerosol concentration shall be replenished using one-half the number of squeezes as initially used.

(J) The test subject shall indicate to the test conductor if at any time during the fit test the taste of saccharin is detected.

(K) If the taste of saccharin is detected, the fit is deemed unsatisfactory and a different respirator shall be tried.

(d) Irritant fume protocol.

(i) The respirator to be tested shall be equipped with high-efficiency particulate air (HEPA) filters.

(ii) The test subject shall be allowed to smell a weak concentration of the irritant smoke before the respirator is donned to become familiar with its characteristic odor.

(iii) Break both ends of a ventilation smoke tube containing stannic oxychloride, such as the MSA part No. 5645, or equivalent. Attach one end of the smoke tube to a low flow air pump set to deliver two hundred milliliters per minute.

(iv) If a half-mask is being fitted, advise the test subject that the smoke can be irritating to the eyes and instruct the subject to keep his/her eyes closed while the test is performed.

(v) The test conductor shall direct the stream of irritant smoke from the smoke tube towards the face seal area of the test subject. He/she shall begin at least twelve inches from

the facepiece and gradually move to within one inch, moving around the whole perimeter of the mask.

(vi) The exercises identified in subsection (1)(n) of this section shall be performed by the test subject while the respirator seal is being challenged by the smoke.

(vii) Each test subject passing the smoke test without evidence of a response shall be given a sensitivity check of the smoke from the same tube once the respirator has been removed to determine whether he/she reacts to the smoke. Failure to evoke a response shall void the fit test.

(viii) The fit test shall be performed in a location with exhaust ventilation sufficient to prevent general contamination of the testing area by the test agent.

(3) Quantitative fit test (QNFT) protocol.

(a) General.

(i) The employer shall assign specific individuals who shall assume full responsibility for implementing the respirator quantitative fit test program.

(ii) The employer shall ensure that persons administering QNFT are able to calibrate equipment and perform tests properly, recognize invalid tests, calculate fit factors properly and assure that test equipment is in proper working order.

(iii) The employer shall assure that QNFT equipment is kept clean and well maintained so as to operate at the parameters for which it was designed.

(b) Definitions.

(i) "Quantitative fit test." The test is performed in a test chamber. The normal air-purifying element of the respirator is replaced by a high-efficiency particulate air (HEPA) filter in the case of particulate QNFT aerosols or a sorbent offering contaminant penetration protection equivalent to high-efficiency filters where the QNFT test agency is a gas or vapor.

(ii) "Challenge agent" means the aerosol, gas, or vapor introduced into a test chamber so that its concentration inside and outside the respirator may be measured.

(iii) "Test subject" means the person wearing the respirator for quantitative fit testing.

(iv) "Normal standing position" means standing erect and straight with arms down along the sides and looking straight ahead.

(v) "Maximum peak penetration method" means the method of determining test agent penetration in the respirator as determined by strip chart recordings of the test. The highest peak penetration for a given exercise is taken to be representative of average penetration into the respirator for that exercise.

(vi) "Average peak penetration method" means the method of determining test agent penetration into the respirator utilizing a strip chart recorder, integrator, or computer. The agent penetration is determined by an average of the peak heights on the graph or by computer integration, for each exercise except the grimace exercise. Integrators or computers which calculate the actual test agent penetration into the respirator for each exercise will also be considered to meet the requirements of the average peak penetration method.

(vii) "Fit factor" means the ratio of challenge agent concentration outside with respect to the inside of a respirator inlet covering (facepiece or enclosure).

(c) Apparatus.

(i) Instrumentation. Aerosol generation, dilution, and measurement systems using corn oil or sodium chloride as test aerosols shall be used for quantitative fit testing.

(ii) Test chamber. The test chamber shall be large enough to permit all test subjects to perform freely all required exercises without disturbing the challenge agent concentration or the measurement apparatus. The test chamber shall be equipped and constructed so that the challenge agent is effectively isolated from the ambient air, yet uniform in concentration throughout the chamber.

(iii) When testing air-purifying respirators, the normal filter or cartridge element shall be replaced with a high-efficiency particulate filter supplied by the same manufacturer.

(iv) The sampling instrument shall be selected so that a strip chart record may be made of the test showing the rise and fall of the challenge agent concentration with each inspiration and expiration at fit factors of at least two thousand. Integrators or computers which integrate the amount of test agent penetration leakage into the respirator for each exercise may be used provided a record of the readings is made.

(v) The combination of substitute air-purifying elements, challenge agent, and challenge agent concentration in the test chamber shall be such that the test subject is not exposed in excess of an established exposure limit for the challenge agent at any time during the testing process.

(vi) The sampling port on the test specimen respirator shall be placed and constructed so that no leakage occurs around the port (e.g., where the respirator is probed), a free air flow is allowed into the sampling line at all times and so that there is no interference with the fit or performance of the respirator.

(vii) The test chamber and test set-up shall permit the person administering the test to observe the test subject inside the chamber during the test.

(viii) The equipment generating the challenge atmosphere shall maintain the concentration of challenge agent inside the test chamber constant to within a ten percent variation for the duration of the test.

(ix) The time lag (interval between an event and the recording of the event on the strip chart or computer or integrator) shall be kept to a minimum. There shall be a clear association between the occurrence of an event inside the test chamber and its being recorded.

(x) The sampling line tubing for the test chamber atmosphere and for the respirator sampling port shall be of equal diameter and of the same material. The length of the two lines shall be equal.

(xi) The exhaust flow from the test chamber shall pass through a high-efficiency filter before release.

(xii) When sodium chloride aerosol is used, the relative humidity inside the test chamber shall not exceed fifty percent.

(xiii) The limitations of instrument detection shall be taken into account when determining the fit factor.

(xiv) Test respirators shall be maintained in proper working order and inspected for deficiencies such as cracks, missing valves and gaskets, etc.

(d) Procedural requirements.

(i) When performing the initial positive or negative pressure test the sampling line shall be crimped closed in order to avoid air pressure leakage during either of these tests.

(ii) An abbreviated screening isoamyl acetate test or irritant fume test may be utilized in order to quickly identify poor fitting respirators which passed the positive and/or negative pressure test and thus reduce the amount of QNFT time. When performing a screening isoamyl acetate test, combination high-efficiency organic vapor cartridges/canisters shall be used.

(iii) A reasonable stable challenge agent concentration shall be measured in the test chamber prior to testing. For canopy or shower curtain type of test units the determination of the challenge agent stability may be established after the test subject has entered the test environment.

(iv) Immediately after the subject enters the test chamber, the challenge agent concentration inside the respirator shall be measured to ensure that the peak penetration does not exceed five percent for a half mask or one percent for a full facepiece respirator.

(v) A stable challenge concentration shall be obtained prior to the actual start of testing.

(vi) Respirator restraining straps shall not be overtightened for testing. The straps shall be adjusted by the wearer without assistance from other persons to give a reasonable comfortable fit typical of normal use.

(vii) The test shall be terminated whenever any single peak penetration exceeds five percent for half masks and one percent for full facepiece respirators. The test subject shall be refitted and retested. If two of the three required tests are terminated, the fit shall be deemed inadequate.

(viii) In order to successfully complete a QNFT, three successful fit tests are required. The results of each of the three independent fit tests must exceed the minimum fit factor needed for the class of respirator (e.g., half mask respirator, full facepiece respirator).

(ix) Calculation of fit factors.

(A) The fit factor shall be determined for the quantitative fit test by taking the ratio of the average chamber concentration to the concentration inside the respirator.

(B) The average test chamber concentration is the arithmetic average of the test chamber concentration at the beginning and of the end of the test.

(c) The concentration of the challenge agent inside the respirator shall be determined by one of the following methods:

(I) Average peak concentration;

(II) Maximum peak concentration;

(III) Integration by calculation of the area under the individual peak for each exercise. This includes computerized integration.

(x) Interpretation of test results. The fit factor established by the quantitative fit testing shall be the lowest of the three fit factor values calculated from the three required fit tests.

(xi) The test subject shall not be permitted to wear a half mask, or full facepiece respirator unless a minimum fit factor equivalent to at least ten times the hazardous exposure level is obtained.

(xii) Filters used for quantitative fit testing shall be replaced at least weekly, or whenever increased breathing resistance is encountered, or when the test agent has altered the integrity of the filter media. Organic vapor cartridges/canisters shall be replaced daily (when used) or sooner if there is any indication of breakthrough by a test agent.

[Statutory Authority: Chapter 49.17 RCW. 96-09-030, § 296-62-07550, filed 4/10/96, effective 6/1/96; 88-21-002 (Order 88-23), § 296-62-07550, filed 10/6/88, effective 11/7/88.]

WAC 296-62-076 Methylenedianiline.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-62-076, filed 2/3/93, effective 3/15/93.]

WAC 296-62-07601 Scope and application. (1) WAC 296-62-076 applies to all occupational exposures to MDA, Chemical Abstracts Service Registry No. 101-77-9, except as provided in subsections (2) through (7) of this section.

(2) Except as provided in subsection (8) of this section and WAC 296-62-07609(5), this section does not apply to the processing, use, and handling of products containing MDA where initial monitoring indicates that the product is not capable of releasing MDA in excess of the action level under the expected conditions of processing, use, and handling which will cause the greatest possible release; and where no "dermal exposure to MDA" can occur.

(3) Except as provided in subsection (8) of this section, WAC 296-62-076 does not apply to the processing, use, and handling of products containing MDA where objective data are reasonably relied upon which demonstrate the product is not capable of releasing MDA under the expected conditions of processing, use, and handling which will cause the greatest possible release; and where no "dermal exposure to MDA" can occur.

(4) WAC 296-62-076 does not apply to the storage, transportation, distribution, or sale of MDA in intact containers sealed in such a manner as to contain the MDA dusts, vapors, or liquids, except for the provisions of WAC 296-62-054 and 296-62-07607.

(5) WAC 296-62-076 does not apply to the construction industry as defined in WAC 296-155-012(6). (Exposure to MDA in the construction industry is covered by WAC 296-155-173.)

(6) Except as provided in subsection (8) of this section, WAC 296-62-076 does not apply to materials in any form which contain less than 0.1% MDA by weight or volume.

(7) Except as provided in subsection (8) of this section, WAC 296-62-076 does not apply to "finished articles containing MDA."

(8) Where products containing MDA are exempted under subsections (2) through (7) of this section, the employer shall maintain records of the initial monitoring results or objective data supporting that exemption and the basis for the employer's reliance on the data, as provided in the recordkeeping provision of WAC 296-62-07631.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-62-07601, filed 2/3/93, effective 3/15/93.]

WAC 296-62-07603 Definitions. For the purpose of WAC 296-62-076, the following definitions shall apply:

(1) "Action level" means a concentration of airborne MDA of 5 ppb as an 8-hour time-weighted average.

(2) "Authorized person" means any person specifically authorized by the employer whose duties require the person to enter a regulated area, or any person entering such an area as a designated representative of employees, for the purpose of exercising the right to observe monitoring and measuring procedures under WAC 296-62-07633 of WAC 296-62-076, or any other person authorized by WISHA or regulations issued by WISHA.

(3) "Container" means any barrel, bottle, can, cylinder, drum, reaction vessel, storage tank, commercial packaging, or the like, but does not include piping systems.

(4) "Dermal exposure to MDA" occurs where employees are engaged in the handling, application, or use of mixtures or materials containing MDA, with any of the following nonairborne forms of MDA:

(a) Liquid, powdered, granular, or flaked mixtures containing MDA in concentrations greater than 0.1% by weight or volume; and

(b) Materials other than "finished articles" containing MDA in concentrations greater than 0.1% by weight or volume.

(5) "Director" means the director of the department of labor and industries, or his/her designated representative.

(6) "Emergency" means any occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment which results in an unexpected and potentially hazardous release of MDA.

(7) "Employee exposure" means exposure to MDA which would occur if the employee were not using respirators or protective work clothing and equipment.

(8) "Finished article containing MDA" is defined as a manufactured item:

(a) Which is formed to a specific shape or design during manufacture;

(b) Which has end use function(s) dependent in whole or part upon its shape or design during end use; and

(c) Where applicable, is an item which is fully cured by virtue of having been subjected to the conditions (temperature, time) necessary to complete the desired chemical reaction.

(9) "4,4' methylenedianiline" or "MDA" means the chemical 4,4'-diaminodiphenylmethane, Chemical Abstract Service Registry number 101-77-9, in the form of a vapor, liquid, or solid. The definition also includes the salts of MDA.

(10) "Regulated areas" means areas where airborne concentrations of MDA exceed or can reasonably be expected to exceed, the permissible exposure limits, or where dermal exposure to MDA can occur.

(11) "STEL" means short-term exposure limit as determined by any 15 minute sample period.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-62-07603, filed 2/3/93, effective 3/15/93.]

WAC 296-62-07605 Permissible exposure limits (PEL). The employer shall assure that no employee is

exposed to an airborne concentration of MDA in excess of ten parts per billion (10 ppb) as an 8-hour time-weighted average or a STEL of 100 ppb.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-62-07605, filed 2/3/93, effective 3/15/93.]

WAC 296-62-07607 Emergency situations. (1) Written plan.

(a) A written plan for emergency situations shall be developed for each workplace where there is a possibility of an emergency. Appropriate portions of the plan shall be implemented in the event of an emergency.

(b) The plan shall specifically provide that employees engaged in correcting emergency conditions shall be equipped with the appropriate personal protective equipment and clothing as required in WAC 296-62-07615 and 296-62-07617 until the emergency is abated.

(c) The plan shall specifically include provisions for alerting and evacuating affected employees as well as the elements prescribed in chapter 296-24 WAC, Part G-1, "Employee emergency plans and fire prevention plans."

(2) Alerting employees. Where there is the possibility of employee exposure to MDA due to an emergency, means shall be developed to alert promptly those employees who have the potential to be directly exposed. Affected employees not engaged in correcting emergency conditions shall be evacuated immediately in the event that an emergency occurs. Means shall also be developed and implemented for alerting other employees who may be exposed as a result of the emergency.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-62-07607, filed 2/3/93, effective 3/15/93.]

WAC 296-62-07609 Exposure monitoring. (1) General.

(a) Determinations of employee exposure shall be made from breathing zone air samples that are representative of each employee's exposure to airborne MDA over an 8-hour period. Determination of employee exposure to the STEL shall be made from breathing zone air samples collected over a 15 minute sampling period.

(b) Representative employee exposure shall be determined on the basis of one or more samples representing full shift exposure for each shift for each job classification in each work area where exposure to MDA may occur.

(c) Where the employer can document that exposure levels are equivalent for similar operations in different work shifts, the employer shall only be required to determine representative employee exposure for that operation during one shift.

(2) Initial monitoring. Each employer who has a workplace or work operation covered by this standard shall perform initial monitoring to determine accurately the airborne concentrations of MDA to which employees may be exposed.

(3) Periodic monitoring and monitoring frequency.

(a) If the monitoring required by subsection (2) of this section reveals employee exposure at or above the action level, but at or below the PELs, the employer shall repeat

such representative monitoring for each such employee at least every six months.

(b) If the monitoring required by subsection (2) of this section reveals employee exposure above the PELs, the employer shall repeat such monitoring for each such employee at least every three months.

(c) The employer may alter the monitoring schedule from every three months to every six months for any employee for whom two consecutive measurements taken at least 7 days apart indicate that the employee exposure has decreased to below the TWA but above the action level.

(4) Termination of monitoring.

(a) If the initial monitoring required by subsection (2) of this section reveals employee exposure to be below the action level, the employer may discontinue the monitoring for that employee, except as otherwise required by subsection (5) of this section.

(b) If the periodic monitoring required by subsection (3) of this section reveals that employee exposures, as indicated by at least two consecutive measurements taken at least 7 days apart, are below the action level the employer may discontinue the monitoring for that employee, except as otherwise required by subsection (5) of this section.

(5) Additional monitoring. The employer shall institute the exposure monitoring required under subsections (2) and (3) of this section when there has been a change in production process, chemicals present, control equipment, personnel, or work practices which may result in new or additional exposures to MDA, or when the employer has any reason to suspect a change which may result in new or additional exposures.

(6) Accuracy of monitoring. Monitoring shall be accurate, to a confidence level of 95 percent, to within plus or minus 25 percent for airborne concentrations of MDA.

(7) Employee notification of monitoring results.

(a) The employer shall, within 15 working days after the receipt of the results of any monitoring performed under this standard, notify each employee of these results, in writing, either individually or by posting of results in an appropriate location that is accessible to affected employees.

(b) The written notification required by subdivision (a) of this subsection shall contain the corrective action being taken by the employer to reduce the employee exposure to or below the PELs, wherever the PELs are exceeded.

(8) Visual monitoring. The employer shall make routine inspections of employee hands, face, and forearms potentially exposed to MDA. Other potential dermal exposures reported by the employee must be referred to the appropriate medical personnel for observation. If the employer determines that the employee has been exposed to MDA the employer shall:

(a) Determine the source of exposure;

(b) Implement protective measures to correct the hazard; and

(c) Maintain records of the corrective actions in accordance with WAC 296-62-07631.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-62-07609, filed 2/3/93, effective 3/15/93.]

WAC 296-62-07611 Regulated areas. (1) Establishment.

(a) Airborne exposures. The employer shall establish regulated areas where airborne concentrations of MDA exceed or can reasonably be expected to exceed, the permissible exposure limits.

(b) Dermal exposures. Where employees are subject to dermal exposure to MDA the employer shall establish those work areas as regulated areas.

(2) Demarcation. Regulated areas shall be demarcated from the rest of the workplace in a manner that minimizes the number of persons potentially exposed.

(3) Access. Access to regulated areas shall be limited to authorized persons.

(4) Personal protective equipment and clothing. Each person entering a regulated area shall be supplied with, and required to use, the appropriate personal protective clothing and equipment in accordance with WAC 296-62-07615 and 296-62-07617.

(5) Prohibited activities. The employer shall ensure that employees do not eat, drink, smoke, chew tobacco or gum, or apply cosmetics in regulated areas.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-62-07611, filed 2/3/93, effective 3/15/93.]

WAC 296-62-07613 Methods of compliance. (1) Engineering controls and work practices.

(a) The employer shall institute engineering controls and work practices to reduce and maintain employee exposure to MDA at or below the PELs except to the extent that the employer can establish that these controls are not feasible or where the provisions of subdivision (b) of this subsection or WAC 296-62-07615(1) apply.

(b) Wherever the feasible engineering controls and work practices which can be instituted are not sufficient to reduce employee exposure to or below the PELs, the employer shall use them to reduce employee exposure to the lowest levels achievable by these controls and shall supplement them by the use of respiratory protective devices which comply with the requirements of WAC 296-62-07615.

(2) Compliance program.

(a) The employer shall establish and implement a written program to reduce employee exposure to or below the PELs by means of engineering and work practice controls, as required by subsection (1) of this section, and by use of respiratory protection where permitted under WAC 296-62-076. The program shall include a schedule for periodic maintenance (e.g., leak detection) and shall include the written plan for emergency situations as specified in WAC 296-62-07607.

(b) Upon request this written program shall be furnished for examination and copying to the director, affected employees, and designated employee representatives. The employer shall review and, as necessary, update such plans at least once every 12 months to make certain they reflect the current status of the program.

(3) Employee rotation. Employee rotation shall not be permitted as a means of reducing exposure.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-62-07613, filed 2/3/93, effective 3/15/93.]

WAC 296-62-07615 Respiratory protection. (1) General. The employer shall provide respirators, and ensure that they are used, where required by this section. Respirators shall be used in the following circumstances:

(a) During the time period necessary to install or implement feasible engineering and work practice controls;

(b) In work operations for which the employer establishes that engineering and work practice controls are not feasible;

(c) In work situations where feasible engineering and work practice controls are not yet sufficient to reduce exposure to or below the PEL; and

(d) In emergencies.

(2) Respirator selection.

(a) Where respirators are required or allowed under WAC 296-62-076, the employer shall select and provide, at no cost to the employee, the appropriate respirator as specified in Table 1, and shall assure that the employee uses the respirator provided.

(b) The employer shall select respirators from among those approved by the Mine Safety and Health Administration and the National Institute for Occupational Safety and Health under the provisions of 30 C.F.R. Part 11 and Part E of this chapter.

(c) Any employee who cannot wear a negative pressure respirator shall be given the option of wearing a positive pressure respirator or any supplied-air respirator operated in the continuous flow or pressure demand mode.

(3) Respirator program. The employer shall institute a respiratory protection program in accordance with Part E of this chapter.

(4) Respirator use.

(a) Where air-purifying respirators (cartridge or canister) are used, the employer shall replace the air-purifying element as needed to maintain the effectiveness of the respirator. The employer shall ensure that each cartridge is dated at the beginning of use.

(b) Employees who wear respirators shall be allowed to leave the regulated area to readjust the facepiece or to wash their faces and to wipe clean the facepieces on their respirators in order to minimize potential skin irritation associated with respirator use.

Table 1.—Respiratory Protection for MDA

Airborne concentration of MDA or condition of use	Respirator type
a. Less than or equal to 10xPEL	(1) Half-mask respirator with HEPA ¹ cartridge ² .
b. Less than or equal to 50xPEL	(1) Full facepiece respirator with HEPA ¹ cartridge or canister ² .
c. Less than or equal to 1000xPEL	(1) Full facepiece powered air-purifying respirator with HEPA ¹ cartridges ² .
d. Greater than 1000xPEL or	(1) Self-contained breathing unknown concentrations apparatus with full facepiece in positive pressure mode; (2) Full facepiece positive pressure demand supplied-air respirator with auxiliary self-contained air supply.

- e. Escape
- (1) Any full facepiece air-purifying respirator with HEPA¹ cartridges²;
 - (2) Any positive pressure or continuous flow self-contained breathing apparatus with full facepiece or hood.
- f. Fire fighting
- (1) Full facepiece self-contained breathing apparatus in positive pressure demand mode.

Note: Respirators assigned for higher environmental concentrations may be used at lower concentrations.

¹High efficiency particulate in air filter (HEPA) means a filter that is at least 99.97 percent efficient against mono-dispersed particles of 0.3 micrometers or larger.

²Combination HEPA/organic vapor cartridges shall be used whenever MDA in liquid form or a process requiring heat is used.

(5) Respirator fit testing.

(a) The employer shall perform and record the results of either quantitative or qualitative fit tests at the time of initial fitting and at least annually thereafter for each employee wearing a negative pressure respirator. The test shall be used to select a respirator facepiece which provides the required protection as prescribed in Table 1.

(b) The employer shall follow the test protocols outlined in Appendix E of this standard for whichever type of fit testing the employer chooses.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-62-07615, filed 2/3/93, effective 3/15/93.]

WAC 296-62-07617 Protective work clothing and equipment. (1) Provision and use. Where employees are subject to dermal exposure to MDA, where liquids containing MDA can be splashed into the eyes, or where airborne concentrations of MDA are in excess of the PEL, the employer shall provide, at no cost to the employee, and ensure that the employee uses, appropriate protective work clothing and equipment which prevent contact with MDA such as, but not limited to:

- (a) Aprons, coveralls, or other full-body work clothing;
- (b) Gloves, head coverings, and foot coverings; and
- (c) Face shields, chemical goggles; or
- (d) Other appropriate protective equipment which comply with chapter 296-24 WAC, Part A-2.

(2) Removal and storage.

(a) The employer shall ensure that, at the end of their work shift, employees remove MDA-contaminated protective work clothing and equipment that is not routinely removed throughout the day in change rooms provided in accordance with the provisions established for change rooms.

(b) The employer shall ensure that, during their work shift, employees remove all other MDA-contaminated protective work clothing or equipment before leaving a regulated area.

(c) The employer shall ensure that no employee takes MDA-contaminated work clothing or equipment out of the change room, except those employees authorized to do so for the purpose of laundering, maintenance, or disposal.

(d) MDA-contaminated work clothing or equipment shall be placed and stored in closed containers which prevent dispersion of the MDA outside the container.

(e) Containers of MDA-contaminated protective work clothing or equipment which are to be taken out of change rooms or the workplace for cleaning, maintenance, or disposal shall bear labels warning of the hazards of MDA.

(3) Cleaning and replacement.

(a) The employer shall provide the employee with clean protective clothing and equipment. The employer shall ensure that protective work clothing or equipment required by this paragraph is cleaned, laundered, repaired, or replaced at intervals appropriate to maintain its effectiveness.

(b) The employer shall prohibit the removal of MDA from protective work clothing or equipment by blowing, shaking, or any methods which allow MDA to reenter the workplace.

(c) The employer shall ensure that laundering of MDA-contaminated clothing shall be done so as to prevent the release of MDA in the workplace.

(d) Any employer who gives MDA-contaminated clothing to another person for laundering shall inform such person of the requirement to prevent the release of MDA.

(e) The employer shall inform any person who launders or cleans protective clothing or equipment contaminated with MDA of the potentially harmful effects of exposure.

(f) MDA-contaminated clothing shall be transported in properly labeled, sealed, impermeable bags or containers.

[Statutory Authority: Chapter 49.17 RCW. 94-20-057 (Order 94-16), § 296-62-07617, filed 9/30/94, effective 11/20/94; 93-04-111 (Order 92-15), § 296-62-07617, filed 2/3/93, effective 3/15/93.]

WAC 296-62-07619 Hygiene facilities and practices.

(1) Change rooms.

(a) The employer shall provide clean change rooms for employees, who must wear protective clothing, or who must use protective equipment because of their exposure to MDA.

(b) Change rooms must be equipped with separate storage for protective clothing and equipment and for street clothes which prevents MDA contamination of street clothes.

(2) Showers.

(a) The employer shall ensure that employees, who work in areas where there is the potential for exposure resulting from airborne MDA (e.g., particulates or vapors) above the action level, shower at the end of the work shift.

(i) Shower facilities required by this section shall comply with WAC 296-24-12009(3).

(ii) The employer shall ensure that employees who are required to shower pursuant to the provisions contained herein do not leave the workplace wearing any protective clothing or equipment worn during the work shift.

(b) Where dermal exposure to MDA occurs, the employer shall ensure that materials spilled or deposited on the skin are removed as soon as possible by methods which do not facilitate the dermal absorption of MDA.

(3) Lunch facilities.

(a) Availability and construction.

(i) Whenever food or beverages are consumed at the worksite and employees are exposed to MDA at or above the PEL or are subject to dermal exposure to MDA the employer shall provide readily accessible lunch areas.

(ii) Lunch areas located within the workplace and in areas where there is the potential for airborne exposure to

MDA at or above the PEL shall have a positive pressure, temperature controlled, filtered air supply.

(iii) Lunch areas may not be located in areas within the workplace where the potential for dermal exposure to MDA exists.

(b) The employer shall ensure that employees who have been subjected to dermal exposure to MDA or who have been exposed to MDA above the PEL wash their hands and faces with soap and water prior to eating, drinking, smoking, or applying cosmetics.

(c) The employer shall ensure that employees exposed to MDA do not enter lunch facilities with MDA-contaminated protective work clothing or equipment.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-62-07619, filed 2/3/93, effective 3/15/93.]

WAC 296-62-07621 Communication of hazards to employees. (1) Signs and labels.

(a) The employer shall post and maintain legible signs demarcating regulated areas and entrances or accessways to regulated areas that bear the following legend:

DANGER MDA MAY CAUSE CANCER LIVER TOXIN
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE CLOTHING
MAY BE REQUIRED TO BE WORN IN THIS AREA

(b) The employer shall ensure that labels or other appropriate forms of warning are provided for containers of MDA within the workplace. The labels shall comply with the requirements of WAC 296-62-05411 and shall include the following legend:

(i) For pure MDA

DANGER CONTAINS MDA MAY CAUSE CANCER LIVER TOXIN

(ii) For mixtures containing MDA

DANGER CONTAINS MDA CONTAINS MATERIALS
WHICH MAY CAUSE CANCER LIVER TOXIN

(2) Material safety data sheets (MSDS).

(a) Employers shall obtain or develop, and shall provide access to their employees, to a material safety data sheet (MSDS) for MDA. In meeting this obligation, employers shall make appropriate use of the information found in Appendices A and B.

(b) Employers who are manufacturers or importers shall:

(i) Comply with subdivision (1)(b) of this section as appropriate; and

(ii) Comply with the requirement in WISHA hazard communication standard, WAC 296-62-054, that they deliver to downstream employers an MSDS for MDA.

(3) Information and training.

(a) The employer shall provide employees with information and training on MDA, in accordance with WAC 296-62-054 through 296-62-05415, at the time of initial assignment and at least annually thereafter.

(b) In addition to the information required under WAC 296-62-054, the employer shall:

(i) Provide an explanation of the contents of WAC 296-62-076, including Appendices A and B, and indicate to employees where a copy of the standard is available;

(ii) Describe the medical surveillance program required under WAC 296-62-07625, and explain the information contained in Appendix C; and

(iii) Describe the medical removal provision required under WAC 296-62-07625.

(4) Access to training materials.

(a) The employer shall make readily available to all affected employees, without cost, all written materials relating to the employee training program, including a copy of this regulation.

(b) The employer shall provide to the director, upon request, all information and training materials relating to the employee information and training program.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-62-07621, filed 2/3/93, effective 3/15/93.]

WAC 296-62-07623 Housekeeping. (1) All surfaces shall be maintained as free as practicable of visible accumulations of MDA.

(2) The employer shall institute a program for detecting MDA leaks, spills, and discharges, including regular visual inspections of operations involving liquid or solid MDA.

(3) All leaks shall be repaired and liquid or dust spills cleaned up promptly.

(4) Surfaces contaminated with MDA may not be cleaned by the use of compressed air.

(5) Shoveling, dry sweeping, and other methods of dry clean-up of MDA may be used where HEPA-filtered vacuuming and/or wet cleaning are not feasible or practical.

(6) Waste, scrap, debris, bags, containers, equipment, and clothing contaminated with MDA shall be collected and disposed of in a manner to prevent the reentry of MDA into the workplace.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-62-07623, filed 2/3/93, effective 3/15/93.]

WAC 296-62-07625 Medical surveillance. (1) General.

(a) The employer shall make available a medical surveillance program for employees exposed to MDA:

(i) Employees exposed at or above the action level for 30 or more days per year;

(ii) Employees who are subject to dermal exposure to MDA for 15 or more days per year;

(iii) Employees who have been exposed in an emergency situation;

(iv) Employees whom the employer, based on results from compliance with WAC 296-62-07609(8), has reason to believe are being dermally exposed; and

(v) Employees who show signs or symptoms of MDA exposure.

(b) The employer shall ensure that all medical examinations and procedures are performed by, or under the supervision of, a licensed physician, at a reasonable time and place, and provided without cost to the employee.

(2) Initial examinations.

(a) Within 150 days of the effective date of this standard, or before the time of initial assignment, the employer shall provide each employee covered by subdivision (1)(a)

of this section with a medical examination including the following elements:

(i) A detailed history which includes:

(A) Past work exposure to MDA or any other toxic substances;

(B) A history of drugs, alcohol, tobacco, and medication routinely taken (duration and quantity); and

(C) A history of dermatitis, chemical skin sensitization, or previous hepatic disease.

(ii) A physical examination which includes all routine physical examination parameters, skin examination, and signs of liver disease.

(iii) Laboratory tests including:

(A) Liver function tests; and

(B) Urinalysis.

(iv) Additional tests as necessary in the opinion of the physician.

(b) No initial medical examination is required if adequate records show that the employee has been examined in accordance with the requirements of WAC 296-62-076 within the previous six months prior to the effective date of this standard or prior to the date of initial assignment.

(3) Periodic examinations.

(a) The employer shall provide each employee covered by WAC 296-62-076 with a medical examination at least annually following the initial examination. These periodic examinations shall include at least the following elements:

(i) A brief history regarding any new exposure to potential liver toxins, changes in drug, tobacco, and alcohol intake, and the appearance of physical signs relating to the liver and the skin;

(ii) The appropriate tests and examinations including liver function tests and skin examinations; and

(iii) Appropriate additional tests or examinations as deemed necessary by the physician.

(b) If in the physicians' opinion the results of liver function tests indicate an abnormality, the employee shall be removed from further MDA exposure in accordance with WAC 296-62-07627 and 296-62-07629. Repeat liver function tests shall be conducted on advice of the physician.

(4) Emergency examinations. If the employer determines that the employee has been exposed to a potentially hazardous amount of MDA in an emergency situation as addressed in WAC 296-62-07607, the employer shall provide medical examinations in accordance with subsection (3) of this section. If the results of liver function testing indicate an abnormality, the employee shall be removed in accordance with WAC 296-62-07627 and 296-62-07629. Repeat liver function tests shall be conducted on the advice of the physician. If the results of the tests are normal, tests must be repeated two to three weeks from the initial testing. If the results of the second set of tests are normal and on the advice of the physician, no additional testing is required.

(5) Additional examinations. Where the employee develops signs and symptoms associated with exposure to MDA, the employer shall provide the employee with an additional medical examination including a liver function test. Repeat liver function tests shall be conducted on the advice of the physician. If the results of the tests are normal, tests must be repeated two to three weeks from the initial testing. If the results of the second set of tests are

normal and, on the advice of the physician, no additional testing is required.

(6) Multiple physician review mechanism.

(a) If the employer selects the initial physician who conducts any medical examination or consultation provided to an employee under WAC 296-62-076, and the employee has signs or symptoms of occupational exposure to MDA (which could include an abnormal liver function test), and the employee disagrees with the opinion of the examining physician, and this opinion could affect the employee's job status, the employee may designate an appropriate, mutually acceptable second physician:

(i) To review any findings, determinations, or recommendations of the initial physician; and

(ii) To conduct such examinations, consultations, and laboratory tests as the second physician deems necessary to facilitate this review.

(b) The employer shall promptly notify an employee of the right to seek a second medical opinion after each occasion that an initial physician conducts a medical examination or consultation pursuant to WAC 296-62-076. The employer may condition its participation in, and payment for, the multiple physician review mechanism upon the employee doing the following within fifteen days after receipt of the foregoing notification, or receipt of the initial physician's written opinion, whichever is later:

(i) The employee informing the employer that he or she intends to seek a second medical opinion; and

(ii) The employee initiating steps to make an appointment with a second physician.

(c) If the findings, determinations, or recommendations of the second physician differ from those of the initial physician, then the employer and the employee shall assure that efforts are made for the two physicians to resolve any disagreement.

(d) If the two physicians have been unable to resolve quickly their disagreement, then the employer and the employee through their respective physicians shall designate a third physician:

(i) To review any findings, determinations, or recommendations of the prior physicians; and

(ii) To conduct such examinations, consultations, laboratory tests, and discussions with the prior physicians as the third physician deems necessary to resolve the disagreement of the prior physicians.

(e) The employer shall act consistent with the findings, determinations, and recommendations of the third physician, unless the employer and the employee reach an agreement which is otherwise consistent with the recommendations of at least one of the three physicians.

(7) Information provided to the examining and consulting physicians.

(a) The employer shall provide the following information to the examining physician:

(i) A copy of this regulation and its appendices;

(ii) A description of the affected employee's duties as they relate to the employee's potential exposure to MDA;

(iii) The employee's current actual or representative MDA exposure level;

(iv) A description of any personal protective equipment used or to be used; and

(v) Information from previous employment-related medical examinations of the affected employee.

(b) The employer shall provide the foregoing information to a second physician under this section upon request either by the second physician or by the employee.

(8) Physician's written opinion.

(a) For each examination under WAC 296-62-076, the employer shall obtain, and provide the employee with a copy of, the examining physician's written opinion within 15 days of its receipt. The written opinion shall include the following:

(i) The occupationally-pertinent results of the medical examination and tests;

(ii) The physician's opinion concerning whether the employee has any detected medical conditions which would place the employee at increased risk of material impairment of health from exposure to MDA;

(iii) The physician's recommended limitations upon the employee's exposure to MDA or upon the employee's use of protective clothing or equipment and respirators; and

(iv) A statement that the employee has been informed by the physician of the results of the medical examination and any medical conditions resulting from MDA exposure which require further explanation or treatment.

(b) The written opinion obtained by the employer shall not reveal specific findings or diagnoses unrelated to occupational exposures.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-62-07625, filed 2/3/93, effective 3/15/93.]

WAC 296-62-07627 Medical removal—Temporary medical removal of an employee. Temporary medical removal of an employee.

(1) Temporary removal resulting from occupational exposure. The employee shall be removed from work environments in which exposure to MDA is at or above the action level or where dermal exposure to MDA may occur, following an initial examination (WAC 296-62-07625(2)), periodic examinations (WAC 296-62-07625(3)), an emergency situation (WAC 296-62-07625(4)), or an additional examination (WAC 296-62-07625(5)) in the following circumstances:

(a) When the employee exhibits signs and/or symptoms indicative of acute exposure to MDA; or

(b) When the examining physician determines that an employee's abnormal liver function tests are not associated with MDA exposure but that the abnormalities may be exacerbated as a result of occupational exposure to MDA.

(c) Temporary removal due to a final medical determination.

(i) The employer shall remove an employee from work environments in which exposure to MDA is at or above the action level or where dermal exposure to MDA may occur, on each occasion that there is a final medical determination or opinion that the employee has a detected medical condition which places the employee at increased risk of material impairment to health from exposure to MDA.

(ii) For the purposes of WAC 296-62-076, the phrase "final medical determination" shall mean the outcome of the

physician review mechanism used pursuant to the medical surveillance provisions of this section.

(iii) Where a final medical determination results in any recommended special protective measures for an employee, or limitations on an employee's exposure to MDA, the employer shall implement and act consistent with the recommendation.

(2) Return of the employee to former job status.

(a) The employer shall return an employee to his or her former job status:

(i) When the employee no longer shows signs or symptoms of exposure to MDA or upon the advice of the physician.

(ii) When a subsequent final medical determination results in a medical finding, determination, or opinion that the employee no longer has a detected medical condition which places the employee at increased risk of material impairment to health from exposure to MDA.

(b) For the purposes of this section, the requirement that an employer return an employee to his or her former job status is not intended to expand upon or restrict any rights an employee has or would have had, absent temporary medical removal, to a specific job classification or position under the terms of a collective bargaining agreement.

(3) Removal of other employee special protective measure or limitations. The employer shall remove any limitations placed on an employee, or end any special protective measures provided to an employee, pursuant to a final medical determination, when a subsequent final medical determination indicates that the limitations or special protective measures are no longer necessary.

(4) Employer options pending a final medical determination. Where the physician review mechanism used pursuant to the medical surveillance provisions of WAC 296-62-076, has not yet resulted in a final medical determination with respect to an employee, the employer shall act as follows:

(a) Removal. The employer may remove the employee from exposure to MDA, provide special protective measures to the employee, or place limitations upon the employee, consistent with the medical findings, determinations, or recommendations of any of the physicians who have reviewed the employee's health status.

(b) Return. The employer may return the employee to his or her former job status, and end any special protective measures provided to the employee, consistent with the medical findings, determinations, or recommendations of any of the physicians who have reviewed the employee's health status, with two exceptions.

(i) If the initial removal, special protection, or limitation of the employee resulted from a final medical determination which differed from the findings, determinations, or recommendations of the initial physician; or

(ii) If the employee has been on removal status for the preceding six months as a result of exposure to MDA, then the employer shall await a final medical determination.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-62-07627, filed 2/3/93, effective 3/15/93.]

WAC 296-62-07629 Medical removal protection benefits. (1) Provisions of medical removal protection

benefits. The employer shall provide to an employee up to six months of medical removal protection benefits on each occasion that an employee is removed from exposure to MDA or otherwise limited pursuant to this section.

(2) Definition of medical removal protection benefits. For the purposes of this section, the requirement that an employer provide medical removal protection benefits means that the employer shall maintain the earnings, seniority, and other employment rights and benefits of an employee as though the employee had not been removed from normal exposure to MDA or otherwise limited.

(3) Follow-up medical surveillance during the period of employee removal or limitations. During the period of time that an employee is removed from normal exposure to MDA or otherwise limited, the employer may condition the provision of medical removal protection benefits upon the employee's participation in follow-up medical surveillance made available pursuant to WAC 296-62-076.

(4) Workers' compensation claims. If a removed employee files a claim for workers' compensation payments for an MDA-related disability, then the employer shall continue to provide medical removal protection benefits pending disposition of the claim. To the extent that an award is made to the employee for earnings lost during the period of removal, the employer's medical removal protection obligation shall be reduced by such amount. The employer shall receive no credit for workers' compensation payments received by the employee for treatment-related expenses.

(5) Other credits. The employer's obligation to provide medical removal protection benefits to a removed employee shall be reduced to the extent that the employee receives compensation for earnings lost during the period of removal either from a publicly or employer-funded compensation program, or receives income from non-MDA-related employment with any employer made possible by virtue of the employee's removal.

(6) Employees who do not recover within the 6 months of removal. The employer shall take the following measures with respect to any employee removed from exposure to MDA:

(a) The employer shall make available to the employee a medical examination pursuant to this section to obtain a final medical determination with respect to the employee;

(b) The employer shall assure that the final medical determination obtained indicates whether or not the employee may be returned to his or her former job status, and, if not, what steps should be taken to protect the employee's health;

(c) Where the final medical determination has not yet been obtained, or, once obtained indicates that the employee may not yet be returned to his or her former job status, the employer shall continue to provide medical removal protection benefits to the employee until either the employee is returned to former job status, or a final medical determination is made that the employee is incapable of ever safely returning to his or her former job status; and

(d) Where the employer acts pursuant to a final medical determination which permits the return of the employee to his or her former job status, despite what would otherwise be an abnormal liver function test, later questions concerning

removing the employee again shall be decided by a final medical determination. The employer need not automatically remove such an employee pursuant to the MDA removal criteria provided by WAC 296-62-076.

(7) Voluntary removal or restriction of an employee. Where an employer, although not required by WAC 296-62-076 to do so, removes an employee from exposure to MDA or otherwise places limitations on an employee due to the effects of MDA exposure on the employee's medical condition, the employer shall provide medical removal protection benefits to the employee equal to that required by this section.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-62-07629, filed 2/3/93, effective 3/15/93.]

WAC 296-62-07631 Recordkeeping. (1) Monitoring data for exempted employers.

(a) Where as a result of the initial monitoring the processing, use, or handling of products made from or containing MDA are exempted from other requirements of this section under WAC 296-62-07601(2), the employer shall establish and maintain an accurate record of monitoring relied on in support of the exemption.

(b) This record shall include at least the following information:

(i) The product qualifying for exemption;

(ii) The source of the monitoring data (e.g., was monitoring performed by the employer or a private contractor);

(iii) The testing protocol, results of testing, and/or analysis of the material for the release of MDA;

(iv) A description of the operation exempted and how the data support the exemption (e.g., are the monitoring data representative of the conditions at the affected facility); and

(v) Other data relevant to the operations, materials, processing, or employee exposures covered by the exemption.

(c) The employer shall maintain this record for the duration of the employer's reliance upon such objective data.

(2) Objective data for exempted employers.

(a) Where the processing, use, or handling of products made from or containing MDA are exempted from other requirements of WAC 296-62-076 under WAC 296-62-07601, the employer shall establish and maintain an accurate record of objective data relied upon in support of the exemption.

(b) This record shall include at least the following information:

(i) The product qualifying for exemption;

(ii) The source of the objective data;

(iii) The testing protocol, results of testing, and/or analysis of the material for the release of MDA;

(iv) A description of the operation exempted and how the data support the exemption; and

(v) Other data relevant to the operations, materials, processing, or employee exposures covered by the exemption.

(c) The employer shall maintain this record for the duration of the employer's reliance upon such objective data.

(3) Exposure measurements.

(a) The employer shall establish and maintain an accurate record of all measurements required by WAC 296-62-07609, in accordance with Part B of this chapter.

(b) This record shall include:

(i) The dates, number, duration, and results of each of the samples taken, including a description of the procedure used to determine representative employee exposures;

(ii) Identification of the sampling and analytical methods used;

(iii) A description of the type of respiratory protective devices worn, if any; and

(iv) The name, Social Security number, job classification, and exposure levels of the employee monitored and all other employees whose exposure the measurement is intended to represent.

(c) The employer shall maintain this record for at least 30 years, in accordance with Part B of this chapter.

(4) Medical surveillance.

(a) The employer shall establish and maintain an accurate record for each employee subject to medical surveillance required by WAC 296-62-07625, 296-62-07627, and 296-62-07629, in accordance with Part B of this chapter.

(b) This record shall include:

(i) The name, Social Security number, and description of the duties of the employee;

(ii) The employer's copy of the physician's written opinion on the initial, periodic, and any special examinations, including results of medical examination and all tests, opinions, and recommendations;

(iii) Results of any airborne exposure monitoring done for that employee and the representative exposure levels supplied to the physician; and

(iv) Any employee medical complaints related to exposure to MDA.

(c) The employer shall keep, or assure that the examining physician keeps, the following medical records:

(i) A copy of this standard and its appendices, except that the employer may keep one copy of the standard and its appendices for all employees provided the employer references the standard and its appendices in the medical surveillance record of each employee;

(ii) A copy of the information provided to the physician as required by any sections in the regulatory text;

(iii) A description of the laboratory procedures and a copy of any standards or guidelines used to interpret the test results or references to the information;

(iv) A copy of the employee's medical and work history related to exposure to MDA.

(d) The employer shall maintain this record for at least the duration of employment plus 30 years, in accordance with Part B of this chapter.

(5) Medical removals.

(a) The employer shall establish and maintain an accurate record for each employee removed from current exposure to MDA pursuant to WAC 296-62-07625, 296-62-07627, and 296-62-07629.

(b) Each record shall include:

(i) The name and Social Security number of the employee;

(ii) The date of each occasion that the employee was removed from current exposure to MDA as well as the

corresponding date on which the employee was returned to his or her former job status;

(iii) A brief explanation of how each removal was or is being accomplished; and

(iv) A statement with respect to each removal indicating the reason for the removal.

(c) The employer shall maintain each medical removal record for at least the duration of an employee's employment plus 30 years.

(6) Availability.

(a) The employer shall assure that records required to be maintained by WAC 296-62-076 shall be made available, upon request, to the director for examination and copying.

(b) Employee exposure monitoring records required by WAC 296-62-076 shall be provided upon request for examination and copying to employees, employee representatives, and the director in accordance with the applicable sections of WAC 296-62-054.

(c) Employee medical records required by this section shall be provided upon request for examination and copying, to the subject employee, to anyone having the specific written consent of the subject employee, and to the director in accordance with Part B of this chapter.

(7) Transfer of records.

(a) The employer shall comply with the requirements involving transfer of records set forth in WAC 296-62-05215.

(b) If the employer ceases to do business and there is no successor employer to receive and retain the records for the prescribed period, the employer shall notify the director, at least 90 days prior to disposal, and transmit the records to the director if so requested by the director within that period.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-62-07631, filed 2/3/93, effective 3/15/93.]

WAC 296-62-07633 Observation of monitoring. (1) Employee observation. The employer shall provide affected employees, or their designated representatives, an opportunity to observe the measuring or monitoring of employee exposure to MDA conducted pursuant to WAC 296-62-07609.

(2) Observation procedures. When observation of the measuring or monitoring of employee exposure to MDA requires entry into areas where the use of protective clothing and equipment or respirators is required, the employer shall provide the observer with personal protective clothing and equipment or respirators required to be worn by employees working in the area, assure the use of such clothing and equipment or respirators, and require the observer to comply with all other applicable safety and health procedures.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-62-07633, filed 2/3/93, effective 3/15/93.]

WAC 296-62-07635 Effective date. This standard shall become effective March 15, 1993.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-62-07635, filed 2/3/93, effective 3/15/93.]

WAC 296-62-07637 Appendices. The information contained in Appendices A, B, C, and D of WAC 296-62-

076 is not intended by itself, to create any additional obligations not otherwise imposed by this standard nor detract from any existing obligation. The protocols for respiratory fit testing in Appendix E of WAC 296-62-076 are mandatory.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-62-07637, filed 2/3/93, effective 3/15/93.]

WAC 296-62-07639 Startup dates. Compliance with all obligations of this standard commence on the effective date except as follows:

(1) Initial monitoring under WAC 296-62-07609(2) of WAC 296-62-076 shall be completed as soon as possible but no later than June 13, 1993.

(2) Medical examinations under WAC 296-62-07625, 296-62-07627, and 296-62-07629 shall be completed as soon as possible but no later than August 14, 1993.

(3) Emergency plans required by WAC 296-62-07607 shall be provided and available for inspection and copying as soon as possible but no later than July 13, 1993.

(4) Initial training and education shall be completed as soon as possible but no later than July 13, 1993.

(5) Hygiene and lunchroom facilities under WAC 296-62-07619 shall be in operation as soon as possible but no later than March 15, 1994.

(6) Respiratory protection required by WAC 296-62-07615 shall be provided as soon as possible but no later than July 13, 1993.

(7) Written compliance plans required by WAC 296-62-07613(2) shall be completed and available for inspection and copying as soon as possible but no later than July 13, 1993.

(8) WISHA shall enforce the permissible exposure limits in WAC 296-62-07605 no earlier than July 13, 1993.

(9) Engineering controls needed to achieve the PELs must be in place March 15, 1993.

(10) Personal protective clothing required by WAC 296-62-07617 shall be available July 13, 1993.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-62-07639, filed 2/3/93, effective 3/15/93.]

WAC 296-62-07654 Appendix A to WAC 296-62-076—Substance data sheet, for 4,4'-methylenedianiline.

(1) Substance identification.

(a) Substance: Methylenedianiline (MDA).

(b) Permissible exposure:

(i) Airborne: Ten parts per billion parts of air (10 ppb), time-weighted average (TWA) for an 8-hour workday and an action level of five parts per billion parts of air (5 ppb).

(ii) Dermal: Eye contact and skin contact with MDA are not permitted.

(c) Appearance and odor: White to tan solid; amine odor.

(2) Health hazard data.

(a) Ways in which MDA affects your health. MDA can affect your health if you inhale it, or if it comes in contact with your skin or eyes. MDA is also harmful if you happen to swallow it. Do not get MDA in eyes, on skin, or on clothing.

(b) Effects of overexposure.

(i) Short-term (acute) overexposure: Overexposure to MDA may produce fever, chills, loss of appetite, vomiting, jaundice. Contact may irritate skin, eyes, and mucous membranes. Sensitization may occur.

(ii) Long-term (chronic) exposure. Repeated or prolonged exposure to MDA, even at relatively low concentrations, may cause cancer. In addition, damage to the liver, kidneys, blood, and spleen may occur with long-term exposure.

(iii) Reporting signs and symptoms: You should inform your employer if you develop any signs or symptoms which you suspect are caused by exposure to MDA including yellow staining of the skin.

(3) Protective clothing and equipment.

(a) Respirators. Respirators are required for those operations in which engineering controls or work practice controls are not adequate or feasible to reduce exposure to the permissible limit. If respirators are worn, they must have the joint Mine Safety and Health Administration and National Institute for Occupational Safety and Health (NIOSH) seal of approval, and cartridges or canisters must be replaced as necessary to maintain the effectiveness of the respirator. If you experience difficulty breathing while wearing a respirator, you may request a positive pressure respirator from your employer. You must be thoroughly trained to use the assigned respirator, and the training will be provided by your employer. MDA does not have a detectable odor except at levels well above the permissible exposure limits. Do not depend on odor to warn you when a respirator canister is exhausted. If you can smell MDA while wearing a respirator, proceed immediately to fresh air. If you experience difficulty breathing while wearing a respirator, tell your employer.

(b) Protective clothing. You may be required to wear coveralls, aprons, gloves, face shields, or other appropriate protective clothing to prevent skin contact with MDA. Where protective clothing is required, your employer is required to provide clean garments to you, as necessary, to assure that the clothing protects you adequately. Replace or repair impervious clothing that has developed leaks. MDA should never be allowed to remain on the skin. Clothing and shoes which are not impervious to MDA should not be allowed to become contaminated with MDA, and if they do, the clothing and shoes should be promptly removed and decontaminated. The clothing should be laundered to remove MDA or discarded. Once MDA penetrates shoes or other leather articles, they should not be worn again.

(c) Eye protection. You must wear splashproof safety goggles in areas where liquid MDA may contact your eyes. Contact lenses should not be worn in areas where eye contact with MDA can occur. In addition, you must wear a face shield if your face could be splashed with MDA liquid.

(4) Emergency and first aid procedures.

(a) Eye and face exposure. If MDA is splashed into the eyes, wash the eyes for at least 15 minutes. See a doctor as soon as possible.

(b) Skin exposure. If MDA is spilled on your clothing or skin, remove the contaminated clothing and wash the exposed skin with large amounts of soap and water immediately. Wash contaminated clothing before you wear it again.

(c) Breathing. If you or any other person breathes in large amounts of MDA, get the exposed person to fresh air at once. Apply artificial respiration if breathing has stopped. Call for medical assistance or a doctor as soon as possible. Never enter any vessel or confined space where the MDA concentration might be high without proper safety equipment and at least one other person present who will stay outside. A life line should be used.

(d) Swallowing. If MDA has been swallowed and the patient is conscious, do not induce vomiting. Call for medical assistance or a doctor immediately.

(5) Medical requirements. If you are exposed to MDA at a concentration at or above the action level for more than 30 days per year, or exposed to liquid mixtures more than 15 days per year, your employer is required to provide a medical examination, including a medical history and laboratory tests, within 60 days of the effective date of this standard and annually thereafter. These tests shall be provided without cost to you. In addition, if you are accidentally exposed to MDA (either by ingestion, inhalation, or skin/eye contact) under conditions known or suspected to constitute toxic exposure to MDA, your employer is required to make special examinations and tests available to you.

(6) Observation of monitoring. Your employer is required to perform measurements that are representative of your exposure to MDA and you or your designated representative are entitled to observe the monitoring procedure. You are entitled to observe the steps taken in the measurement procedure and to record the results obtained. When the monitoring procedure is taking place in an area where respirators or personal protective clothing and equipment are required to be worn, you and your representative must also be provided with, and must wear, the protective clothing and equipment.

(7) Access to records. You or your representative are entitled to see the records of measurements of your exposure to MDA upon written request to your employer. Your medical examination records can be furnished to your physician or designated representative upon request by you to your employer.

(8) Precautions for safe use, handling, and storage.

(a) Material is combustible. Avoid strong acids and their anhydrides. Avoid strong oxidants. Consult supervisor for disposal requirements.

(b) Emergency clean-up. Wear self-contained breathing apparatus and fully clothe the body in the appropriate personal protective clothing and equipment.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-62-07654, filed 2/3/93, effective 3/15/93.]

WAC 296-62-07656 Appendix B to WAC 296-62-076—Substance technical guidelines, MDA. (1) Identification.

(a) Substance identification. Synonyms: CAS No. 101-77-9. 4,4'-methylenedianiline; 4,4'-methylenebis(aniline); methylenedianiline; dianilinomethane.

(b) Formula: $C_{13}H_{14}N_2$.

(2) Physical data.

(a) Appearance and odor: White to tan solid; amine odor.

(b) Molecular weight: 198.26.

(c) Boiling point: 398-399 degrees C. at 760 mm Hg.

(d) Melting point: 88-93 degrees C. (190-100 degrees F.).

(e) Vapor pressure: 9 mmHg at 232 degrees C.

(f) Evaporation rate (n-butyl acetate = 1): Negligible.

(g) Vapor density (Air=1): Not applicable.

(h) Volatile fraction by weight: Negligible.

(i) Specific gravity (Water=1): Slight.

(j) Heat of combustion: -8.40 kcal/g.

(k) Solubility in water: Slightly soluble in cold water, very soluble in alcohol, benzene, ether, and many organic solvents.

(3) Fire, explosion, and reactivity hazard data.

(a) Flash point: 190 degrees C. (374 degrees F.) Setaflash closed cup.

(b) Flash point: 226 degrees C. (439 degrees F.) Cleveland open cup.

(c) Extinguishing media: Water spray; dry chemical; carbon dioxide.

(d) Special fire fighting procedures: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

(e) Unusual fire and explosion hazards: Fire or excessive heat may cause production of hazardous decomposition products.

(4) Reactivity data.

(a) Stability: Stable.

(b) Incompatibility: Strong oxidizers.

(c) Hazardous decomposition products: As with any other organic material, combustion may produce carbon monoxide. Oxides of nitrogen may also be present.

(d) Hazardous polymerization: Will not occur.

(5) Spill and leak procedures.

(a) Sweep material onto paper and place in fiber carton.

(b) Package appropriately for safe feed to an incinerator or dissolve in compatible waste solvents prior to incineration.

(c) Dispose of in an approved incinerator equipped with afterburner and scrubber or contract with licensed chemical waste disposal service.

(d) Discharge treatment or disposal may be subject to federal, state, or local laws.

(e) Wear appropriate personal protective equipment.

(6) Special storage and handling precautions.

(a) High exposure to MDA can occur when transferring the substance from one container to another. Such operations should be well ventilated and good work practices must be established to avoid spills.

(b) Pure MDA is a solid with a low vapor pressure. Grinding or heating operations increase the potential for exposure.

(c) Store away from oxidizing materials.

(d) Employers shall advise employees of all areas and operations where exposure to MDA could occur.

(7) Housekeeping and hygiene facilities.

(a) The workplace should be kept clean, orderly, and in a sanitary condition. The employer should institute a leak and spill detection program for operations involving MDA in order to detect sources of fugitive MDA emissions.

(b) Adequate washing facilities with hot and cold water are to be provided and maintained in a sanitary condition. Suitable cleansing agents should also be provided to assure the effective removal of MDA from the skin.

(8) Common operations. Common operations in which exposure to MDA is likely to occur include the following: Manufacture of MDA; manufacture of methylene diisocyanate; curing agent for epoxy resin structures; wire coating operations; and filament winding.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-62-07656, filed 2/3/93, effective 3/15/93.]

WAC 296-62-07658 Appendix C to WAC 296-62-076—Medical surveillance guidelines for MDA. (1) Route of entry:

Inhalation; skin absorption; ingestion. MDA can be inhaled, absorbed through the skin, or ingested.

(2) Toxicology:

MDA is a suspect carcinogen in humans. There are several reports of liver disease in humans and animals resulting from acute exposure to MDA. A well documented case of an acute cardiomyopathy secondary to exposure to MDA is on record. Numerous human cases of hepatitis secondary to MDA are known. Upon direct contact MDA may also cause damage to the eyes. Dermatitis and skin sensitization have been observed. Almost all forms of acute environmental hepatic injury in humans involve the hepatic parenchyma and produce hepatocellular jaundice. This agent produces intrahepatic cholestasis. The clinical picture consists of cholestatic jaundice, preceded or accompanied by abdominal pain, fever, and chills. Onset in about 60 percent of all observed cases is abrupt with severe abdominal pain. In about 30 percent of observed cases, the illness presented and evolved more slowly and less dramatically, with only slight abdominal pain. In about 10 percent of the cases only jaundice was evident. The cholestatic nature of the jaundice is evident in the prominence of itching, the histologic predominance of bile stasis, and portal inflammatory infiltration, accompanied by only slight parenchymal injury in most cases, and by the moderately elevated transaminase values. Acute, high doses, however, have been known to cause hepatocellular damage resulting in elevated SGPT, SGOT, alkaline phosphatase, and bilirubin.

Absorption through the skin is rapid. MDA is metabolized and excreted over a 48-hour period. Direct contact may be irritating to the skin, causing dermatitis. Also MDA which is deposited on the skin is not thoroughly removed through washing.

MDA may cause bladder cancer in humans. Animal data supporting this assumption is not available nor is conclusive human data. However, human data collected on workers at a helicopter manufacturing facility where MDA is used suggests a higher incidence of bladder cancer among exposed workers.

(3) Signs and symptoms:

Skin may become yellow from contact with MDA.

Repeated or prolonged contact with MDA may result in recurring dermatitis (red-itchy, cracked skin) and eye irritation. Inhalation, ingestion, or absorption through the skin at high concentrations may result in hepatitis, causing

symptoms such as fever and chills, nausea and vomiting, dark urine, anorexia, rash, right upper quadrant pain, and jaundice. Corneal burns may occur when MDA is splashed in the eyes.

(4) Treatment of acute toxic effects/emergency situation:

If MDA gets into the eyes, immediately wash eyes with large amounts of water. If MDA is splashed on the skin, immediately wash contaminated skin with mild soap or detergent. Employee should be removed from exposure and given proper medical treatment. Medical tests required under the emergency section of the medical surveillance subsection (13)(d) must be conducted.

If the chemical is swallowed do not induce vomiting but remove by gastric lavage.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-62-07658, filed 2/3/93, effective 3/15/93.]

WAC 296-62-07660 Appendix D to WAC 296-62-076—Sampling and analytical methods for MDA monitoring and measurement procedures. Measurements taken for the purpose of determining employee exposure to MDA are best taken so that the representative average 8-hour exposure may be determined from a single 8-hour sample or two 4-hour samples. Short-time interval samples (or grab samples) may also be used to determine average exposure level if a minimum of five measurements are taken in a random manner over the 8-hour work shift. Random sampling means that any portion of the work shift has the same chance of being sampled as any other. The arithmetic average of all such random samples taken on one work shift is an estimate of an employee's average level of exposure for that work shift. Air samples should be taken in the employee's breathing zone (air that would most nearly represent that inhaled by the employee).

There are a number of methods available for monitoring employee exposures to MDA. The method WISHA currently uses is included below.

The employer, however, has the obligation of selecting any monitoring method which meets the accuracy and precision requirements of the standard under his/her unique field conditions. The standard requires that the method of monitoring must have an accuracy, to a 95 percent confidence level, of not less than plus or minus 25 percent for the select PEL.

WISHA methodology.

Sampling procedure.

Apparatus:

Samples are collected by use of a personal sampling pump that can be calibrated within ± 5 percent of the recommended flow rate with the sampling filter in line.

Samples are collected on 37 mm Gelman type A/E glass fiber filters treated with sulfuric acid. The filters are prepared by soaking each filter with 0.5 mL of 0.26N H₂SO₄. (0.26 N H₂SO₄ can be prepared by diluting 1.5 mL of 36N H₂SO₄ to 200 mL with deionized water.) The filters are dried in an oven at 100 degrees C. for one hour and then assembled into three-piece 37 mm polystyrene cassettes without backup pads. The front filter is separated from the

back filter by a polystyrene spacer. The cassettes are sealed with shrink bands and the ends are plugged with plastic plugs.

After sampling, the filters are carefully removed from the cassettes and individually transferred to small vials containing approximately 2 mL deionized water. The vials must be tightly sealed. The water can be added before or after the filters are transferred. The vials must be sealable and capable of holding at least 7 mL of liquid. Small glass scintillation vials with caps containing Teflon liners are recommended.

Reagents:

Deionized water is needed for addition to the vials.

Sampling technique:

Immediately before sampling, remove the plastic plugs from the filter cassettes.

Attach the cassette to the sampling pump with flexible tubing and place the cassette in the employee's breathing zone.

After sampling, seal the cassettes with plastic plugs until the filters are transferred to the vials containing deionized water.

At some convenient time within 10 hours of sampling, transfer the sample filters to vials.

Seal the small vials lengthwise.

Submit at least one blank filter with each sample set. Blanks should be handled in the same manner as samples, but no air is drawn through them.

Record sample volumes (in L of air) for each sample, along with any potential interferences.

Retention efficiency:

A retention efficiency study was performed by drawing 100 L of air (80 percent relative humidity) at 1 L/min through sample filters that had been spiked with 0.814 microgram MDA. Instead of using backup pads, blank acid-treated filters were used as backups in each cassette. Upon analysis, the top filters were found to have an average of 91.8 percent of the spiked amount. There was no MDA found on the bottom filters, so the amount lost was probably due to the slight instability of the MDA salt.

Extraction efficiency:

The average extraction efficiency for six filters spiked at the target concentration is 99.6 percent.

The stability of extracted and derivatized samples was verified by reanalyzing the above six samples the next day using fresh standards. The average extraction efficiency for the reanalyzed samples is 98.7 percent.

Recommended air volume and sampling rate:

The recommended air volume is 100 L.

The recommended sampling rate is 1 L/min.

Interferences (sampling):

MDI appears to be a positive interference. It was found that when MDI was spiked onto an acid-treated filter, the MDI converted to MDA after air was drawn through it.

Suspected interferences should be reported to the laboratory with submitted samples.

Safety precautions (sampling):

Attach the sampling equipment to the employees so that it will not interfere with work performance or safety.

Follow all safety procedures that apply to the work area being sampled.

Analytical procedure:

Apparatus: The following are required for analysis.

A GC equipped with an electron capture detector. For this evaluation a Hewlett Packard 5880 Gas Chromatograph equipped with a Nickel 63 High Temperature Electron Capture Detector and a Linearizer was used.

A GC column capable of separating the MDA derivative from the solvent and interferences. A 6 ft X 2 mm ID glass column packed with 3 percent OV-101 coated on 100/120 Gas Chrom Q or a 25 meter DB-1 or DB-5 capillary column is recommended for this evaluation.

A electronic integrator or some other suitable means of measuring peak areas or heights.

Small resealable vials with Teflon-lined caps capable of holding 4 mL.

A dispenser or pipet for toluene capable of delivering 2.0 mL.

Pipets (or repipets with plastic or Teflon tips) capable of delivering 1 mL for the sodium hydroxide and buffer solutions.

A repipet capable of delivering 25 micro-L HFAA.

Syringes for preparation of standards and injection of standards and samples into a GC.

Volumetric flasks and pipets to dilute the pure MDA in preparation of standards.

Disposable pipets to transfer the toluene layers after the samples are extracted.

Reagents:

0.5 NaOH prepared from reagent grade NaOH.

Toluene, pesticide grade. Burdick and Jackson distilled in glass toluene was used.

Heptafluorobutyric acid anhydride (HFAA). HFAA from Pierce Chemical Company was used.

pH 7.0 phosphate buffer, prepared from 136 g potassium dihydrogen phosphate and 1 L deionized water. The pH is adjusted to 7.0 with saturated sodium hydroxide solution.

4,4'-Methylenedianiline (MDA), reagent grade.

Standard preparation:

Concentrated stock standards are prepared by diluting pure MDA with toluene. Analytical standards are prepared by injecting μ L amounts of diluted stock standards into vials that contain 2.0 mL toluene.

25 μ L HFAA are added to each vial and the vials are capped and shaken for 10 seconds.

After 10 min, 1 mL of buffer is added to each vial.

The vials are recapped and shaken for 10 seconds.

After allowing the layers to separate, aliquots of the toluene (upper) layers are removed with a syringe and analyzed by GC.

Analytical standard concentrations should bracket sample concentrations. Thus, if samples fall out of the range of prepared standards, additional standards must be prepared to ascertain detector response.

Sample preparation:

The sample filters are received in vials containing deionized water.

1 mL of 0.5N NaOH and 2.0 mL toluene are added to each vial.

The vials are recapped and shaken for 10 min.

After allowing the layers to separate, approximately 1 mL aliquots of the toluene (upper) layers are transferred to separate vials with clean disposable pipets.

The toluene layers are treated and analyzed.

Analysis:

GC conditions

Zone temperatures:

Column—220 degrees C.

Injector—235 degrees C.

Detector—335 degrees C.

C Gas flows, N₂ Column—30 mL/min

He Column 0.9 mL/min. (capillary) with
30 mL/min. A₁CH₄ (95/5) makeup gas

Injection volume: 5.0 uL

Column: 6 ft X 1/8 in ID glass, 3% OV-101 on
100/120 Gas Chrom Q or 25 meter x .25 mm DB-1
or DB-5 capillary

Retention time of MDA derivative: 2.5 to 3.5,
depending on column and flow

Chromatogram:

Peak areas or heights are measured by an integrator or other suitable means.

A calibration curve is constructed by plotting response (peak areas or heights) of standard injections versus ug of MDA per sample. Sample concentrations must be bracketed by standards.

Interferences (analytical):

Any compound that gives an electron capture detector response and has the same general retention time as the HFAA derivative of MDA is a potential interference. Suspected interferences reported to the laboratory with submitted samples by the industrial hygienist must be considered before samples are derivatized.

GC parameters may be changed to possibly circumvent interferences.

Retention time on a single column is not considered proof of chemical identity. Analyte identity should be confirmed by GC/MS if possible.

Calculations:

The analyte concentration for samples is obtained from the calibration curve in terms of ug MDA per sample. The extraction efficiency is 100 percent. If any MDA is found on the blank, that amount is subtracted from the sample amounts. The air concentrations are calculated using the following formulae: $\text{Microgram/m}^3 = (\text{microgram MDA per sample}) (1000) / (\text{L of air sampled})$ $\text{ppb} = (\text{microgram/m}^3) (24.46) / (198.3) = (\text{microgram/m}^3) (0.1233)$ where 24.46 is the molar volume at 25 degrees C. and 760 mm Hg.

Safety precautions (analytical):

Avoid skin contact and inhalation of all chemicals.

Restrict the use of all chemicals to a fume hood if possible.

Wear safety glasses and a lab coat at all times while in the lab area.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-62-07660, filed 2/3/93, effective 3/15/93.]

WAC 296-62-07662 Appendix E to WAC 296-62-076—Qualitative and quantitative fit testing procedures.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-62-07662, filed 2/3/93, effective 3/15/93.]

WAC 296-62-07664 Appendix E-1—Qualitative fit test protocols.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-62-07664, filed 2/3/93, effective 3/15/93.]

WAC 296-62-07666 Appendix E-1-a—Isoamyl acetate (banana oil) protocol. (1) Odor threshold screening.

(a) Three 1-liter glass jars with metal lids (e.g., Mason or Ball jars) are required.

(b) Odor-free water (e.g., distilled or spring water) at approximately 25 deg. C. shall be used for the solutions.

(c) The isoamyl acetate (IAA) (also known as isopentyl acetate) stock solution is prepared by adding 1 cc of pure IAA to 800 cc of odor-free water in a 1-liter jar and shaking for 30 seconds. This solution shall be prepared new at least weekly.

(d) The screening test shall be conducted in a room separate from the room used for actual fit testing. The two rooms shall be well ventilated so that circulation of the test solution does not occur and cross contaminate the different testing sites.

(e) The odor test solution is prepared in a second jar by placing 0.4 cc of the stock solution into 500 cc of odor-free water using a clean dropper or pipette. Shake for 30 seconds and allow to stand for two to three minutes so that the IAA concentration above the liquid may reach equilibrium. This solution may be used for only one day.

(f) A test blank is prepared in a third jar by adding 500 cc of odor-free water.

(g) The odor test and test blank jars shall be labelled 1 and 2 for jar identification.

(h) The following instructions shall be typed on a card and placed on the table in front of the two test jars (i.e., 1 and 2): "The purpose of this test is to determine if you can smell banana oil at a low concentration. The two bottles in

front of you contain water. One of these bottles also contains a small amount of banana oil. Be sure the covers are on tight, then shake each bottle for two seconds. Unscrew the lid of each bottle, one at a time, and sniff at the mouth of the bottle. Indicate to the test conductor which bottle contains banana oil."

(i) The mixtures used in the IAA odor detection test shall be prepared in an area separate from where the test is performed in order to prevent olfactory fatigue in the subject.

(j) If the test subject is unable to correctly identify the jar containing the odor test solution, the IAA qualitative fit test may not be used.

(k) If the test subject correctly identifies the jar containing the odor test solution, the test subject may proceed to respirator selection and fit testing.

(2) Respirator selection.

(a) The test subject shall be allowed to pick the most comfortable respirator from a selection including respirators of various sizes from different manufacturers. The selection shall include at least three sizes of elastomeric half facepieces, from at least two manufacturers.

(b) The selection process shall be conducted in a room separate from the fit-test chamber to prevent odor fatigue. Prior to the selection process, the test subject shall be shown how to put on a respirator, how it should be positioned on the face, how to set strap tension and how to determine a "comfortable" respirator. A mirror shall be available to assist the subject in evaluating the fit and positioning of the respirator. This instruction may not constitute the subject's formal training on respirator use, as it is only a review.

(c) The test subject should understand that the employee is being asked to select the respirator which provides the most comfortable fit.

(d) The test subject holds each facepiece up to the face and eliminates those which obviously do not give a comfortable fit. Normally, selection will begin with a half-mask and if a comfortable fit cannot be found, the subject will be asked to test the full facepiece respirators. (A small percentage of users will not be able to wear any half-mask.)

(e) The more comfortable facepieces are noted; the most comfortable mask is donned and worn at least five minutes to assess comfort. All donning and adjustments of the facepiece shall be performed by the test subject without assistance from the test conductor or other person. Assistance in assessing comfort can be given by discussing the points in subdivision (f) below. If the test subject is not familiar with using a particular respirator, the test subject shall be directed to don the mask several times and adjust the straps each time to become adept at setting proper tension on the straps.

(f) Assessment of comfort shall include reviewing the following points with the test subject and allowing the test subject adequate time to determine the comfort of the respirator after donning:

- * Positioning of mask on nose.
- * Room for eye protection.
- * Room to talk.
- * Positioning mask on face and cheeks.

(g) The following criteria shall be used to help determine the adequacy of the respirator fit:

- * Chin properly placed.

- * Strap tension.
- * Fit across nose bridge.
- * Distance from nose to chin.
- * Tendency to slip.
- * Self-observation in mirror.

(h) The test subject shall perform the conventional negative- or positive-pressure fit checks (e.g., see ANSI Z88.2-1980A7). Before beginning the negative- or positive-pressure test, the subject shall be told to "seat" the mask by rapidly moving the head from side to side and up and down, while taking a few deep breaths.

(i) The test subject is now ready for fit testing.

(j) After passing the fit test, the test subject shall be questioned again regarding the comfort of the respirator. If the respirator has become uncomfortable, another model of respirator shall be tried.

(k) The employee shall be given the opportunity to select a different facepiece and to be retested if the chosen facepiece becomes increasingly uncomfortable at any time.

(3) Fit test.

(a) The fit test chamber shall be similar to a clear 55 gallon drum liner suspended inverted over a 2-foot diameter frame, so that the top of chamber is about 6 inches above the test subject's head. The inside top center of the chamber shall have a small hook attached.

(b) Each respirator used for the fitting and fit testing shall be equipped with organic vapor cartridges or offer protection against organic vapors. The cartridges or canisters shall be replaced as necessary to maintain the effectiveness of the respirator.

(c) After selecting, donning, and properly adjusting a respirator, the test subject shall wear it to the fit testing room. This room shall be separate from the room used for odor threshold screening and respirator selection, and shall be well ventilated, as by an exhaust fan or lab hood, to prevent general room contamination.

(d) A copy of the following test exercises and Rainbow Passage shall be taped to the inside of the test chamber.

(e) Test exercises:

(i) Breathe normally.

(ii) Breathe deeply. Be certain breaths are deep and regular.

(iii) Turn head all the way from one side to the other. Inhale on each side. Be certain movement is complete. Do not bump the respirator against the shoulders.

(iv) Nod head up and down. Inhale when head is in the full up position (looking toward ceiling). Be certain motions are complete and made about every second. Do not bump the respirator on the chest.

(v) Talking. Talk aloud and slowly for several minutes. The following paragraph is called the Rainbow Passage. Reading it aloud will result in a wide range of facial movements, and thus be useful to satisfy this requirement. Alternative passages which serve the same purpose may also be used.

Rainbow Passage: When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend,

a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond reach, his friends say he is looking for the pot of gold at the end of the rainbow.

(vi) Jog in place.

(vii) Breathe normally.

(f) Each test subject shall wear the respirator for at least 10 minutes before starting the fit test.

(g) Upon entering the test chamber, the test subject shall be given a 6-inch by 5-inch piece of paper towel or other porous absorbent single ply material, folded in half and wetted with three-quarters of one cc of pure IAA. The test subject shall hang the wet towel on the hook at the top of the chamber.

(h) Allow two minutes for the IAA test concentration to be reached before starting the fit test exercises.

(i) Each exercise described in subdivision (e) above shall be performed for at least one minute.

(j) If at any time during the test, the subject detects the banana-like odor of IAA, the test has failed. The subject shall quickly exit from the test chamber and leave the test area to avoid olfactory fatigue.

(k) If the test is failed, the subject shall return to the selection room and remove the respirator, repeat the odor sensitivity test, select and put on another respirator, return to the test chamber, and again begin the procedure described in subdivisions (d) through (i) above. The process continues until a respirator that fits well has been found. Should the odor sensitivity test be failed, the subject shall wait about 5 minutes before retesting. Odor sensitivity will usually have returned by this time.

(l) If a person cannot pass the fit test described above wearing a half-mask respirator from the available selection, full facepiece models must be used.

(m) When a respirator is found that passes the test, the subject must break the face seal and take a breath before exiting the chamber. This is to assure that the reason the test subject is not smelling the IAA is the good fit of the respirator facepiece seal and not olfactory fatigue.

(n) When the test subject leaves the chamber, the subject shall remove the saturated towel and return it to the person conducting the test. To keep the area from becoming contaminated, the used towels shall be kept in a self-sealing bag so there is no significant IAA concentration buildup in the test chamber during subsequent tests.

(o) Persons who have successfully passed this fit test with a half-mask respirator may be assigned the use of the test respirator in atmospheres with up to 10 times the PEL. In atmospheres greater than 10 times, and less than 50 times the PEL (up to 50 ppm), the subject must pass the IAA test using a full face negative pressure respirator. (The concentration of the IAA inside the test chamber must be increased by five times for QLFT of the full facepiece.)

(p) The test shall not be conducted if there is any hair growth between the skin and the facepiece sealing surface.

(q) If hair growth or apparel interfere with a satisfactory fit, then they shall be altered or removed so as to eliminate interference and allow a satisfactory fit. If a satisfactory fit is still not attained, the test subject must use a positive-pressure respirator such as a powered air-purifying respirator, supplied air respirator, or self-contained breathing apparatus.

(r) If a test subject exhibits difficulty in breathing during the tests, she or he shall be referred to a physician trained in respiratory diseases or pulmonary medicine to determine whether the test subject can wear a respirator while performing her or his duties.

(s) Qualitative fit testing shall be repeated at least every 12 months.

(t) In addition, because the sealing of the respirator may be affected, qualitative fit testing shall be repeated immediately when the test subject has a:

(i) Weight change of 20 pounds or more;

(ii) Significant facial scarring in the area of the facepiece seal;

(iii) Significant dental changes; i.e., multiple extractions without prosthesis, or acquiring dentures;

(iv) Reconstructive or cosmetic surgery; or

(v) Any other condition that may interfere with facepiece sealing.

(4) Recordkeeping. A summary of all test results shall be maintained by the employer for 3 years. The summary shall include:

(a) Name of test subject.

(b) Date of testing.

(c) Name of the test conductor.

(d) Respirators selected (indicate manufacturer, model, size, and approval number).

(e) Testing agent.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-62-07666, filed 2/3/93, effective 3/15/93.]

WAC 296-62-07668 Appendix E-1-b—Saccharin solution aerosol protocol. (1) Respirator selection. Respirators shall be selected as described in WAC 296-62-07666(2) Appendix E-1-a (respirator selection), except that each respirator shall be equipped with a particulate filter.

(2) Taste threshold screening.

(a) An enclosure placed over the head and shoulders shall be used for threshold screening (to determine if the individual can taste saccharin) and for fit testing. The enclosure shall be approximately 12 inches in diameter by 14 inches tall with at least the front clear to allow free movement of the head when a respirator is worn.

(b) The test enclosure shall have a three-quarter inch hole in front of the test subject's nose and mouth area to accommodate the nebulizer nozzle.

(c) The entire screening and testing procedure shall be explained to the test subject prior to conducting the screening test.

(d) During the threshold screening test, the test subject shall don the test enclosure and breathe with open mouth with tongue extended.

(e) Using a DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent, the test conductor shall spray the threshold check solution into the enclosure. This nebulizer shall be clearly marked to distinguish it from the fit test solution nebulizer.

(f) The threshold check solution consists of 0.83 grams of sodium saccharin USP in 100 cc of warm water. It can be prepared by putting 1 cc of the test solution (see subdivision (3)(g)) in 100 cc of water.

(g) To produce the aerosol, the nebulizer bulb is firmly squeezed so that it collapses completely, then is released and allowed to fully expand.

(h) Ten squeezes of the nebulizer bulb are repeated rapidly and then the test subject is asked whether the saccharin can be tasted.

(i) If the first response is negative, ten more squeezes of the nebulizer bulb are repeated rapidly and the test subject is again asked whether the saccharin can be tasted.

(j) If the second response is negative ten more squeezes are repeated rapidly and the test subject is again asked whether the saccharin can be tasted.

(k) The test conductor will take note of the number of squeezes required to elicit a taste response.

(l) If the saccharin is not tasted after 30 squeezes, subdivision (j), the saccharin fit test cannot be performed on the test subject.

(m) If a taste response is elicited, the test subject shall be asked to take note of the taste for reference in the fit test.

(n) Correct use of the nebulizer means that approximately 1 cc of liquid is used at a time in the nebulizer body.

(o) The nebulizer shall be thoroughly rinsed in water, shaken dry, and refilled at least every four hours.

(3) Fit test.

(a) The test subject may not eat, drink (except plain water), or chew gum for 15 minutes before the test.

(b) The test subject shall don and adjust the respirator without assistance from any person.

(c) The fit test uses the same enclosure described in subsection (2) of this section.

(d) Each test subject shall wear the respirator for at least 10 minutes before starting the fit test.

(i) This would be an appropriate time to talk with the test subject; to explain the fit test, the importance of cooperation, and the purpose for the head exercises; or to demonstrate some of the exercises.

(ii) The test subject shall perform the conventional negative- or positive-pressure fit tests (see ANSI Z88.2 1980 A7).

(e) The test subject shall enter the enclosure while wearing the respirator selected in WAC 296-62-07666(2). This respirator shall be properly adjusted and equipped with a particulate filter.

(f) A second DeVilbiss Model 40 Inhalation Medication Nebulizer is used to spray the fit test solution into the enclosure. This nebulizer shall be clearly marked to distinguish it from the screening test solution nebulizer.

(g) The fit test solution is prepared by adding 83 grams of sodium saccharin to 100 cc of warm water.

(h) As before, the test subject shall breathe with mouth open and tongue extended.

(i) The nebulizer is inserted into the hole in the front of the enclosure and the fit test solution is sprayed into the enclosure using the same technique as for the taste threshold screening and the same number of squeezes required to elicit a taste response in the screening. (See subdivisions (2)(h) through (j).)

(j) After generation of the aerosol read the following instructions to the test subject. The test subject shall perform the exercises for one minute each.

(i) Breathe normally.

(ii) Breathe deeply. Be certain breaths are deep and regular.

(iii) Turn head all the way from one side to the other. Be certain movement is complete. Inhale on each side. Do not bump the respirator against the shoulders.

(iv) Nod head up and down. Be certain motions are complete. Inhale when head is in the full up position (when looking toward the ceiling). Do not bump the respirator on the chest.

(v) Talk. Talk aloud and slowly. The following paragraph is called the Rainbow Passage. Reading it will result in a wide range of facial movements, and thus be useful to satisfy this requirement.

Rainbow Passage: When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond his reach, his friends say he is looking for the pot of gold at the end of the rainbow.

(vi) Jog in place.

(vii) Breathe normally.

(k) At the beginning of each exercise, the aerosol concentration shall be replenished using one-half the number of squeezes as initially described in subdivision (i) of this subsection.

(l) The test subject shall indicate to the test conductor if at any time during the fit test the taste of saccharin is detected.

(m) If the saccharin is detected the fit is deemed unsatisfactory and a different respirator shall be tried.

(n) Successful completion of the test protocol shall allow the use of the half mask tested respirator in contaminated atmospheres up to 10 times the PEL of MDA. In other words this protocol may not be used to assign protection factors higher than ten.

(o) The test shall not be conducted if there is any hair growth between the skin and the facepiece sealing surface.

(p) If hair growth or apparel interfere with a satisfactory fit, then they shall be altered or removed so as to eliminate interference and allow a satisfactory fit. If a satisfactory fit is still not attained, the test subject must use a positive-pressure respirator such as powered air-purifying respirators, supplied air respirator, or self-contained breathing apparatus.

(q) If a test subject exhibits difficulty in breathing during the tests, she or he shall be referred to a physician trained in respiratory diseases or pulmonary medicine to determine whether the test subject can wear a respirator while performing her or his duties.

(r) Qualitative fit testing shall be repeated at least every 12 months.

(s) In addition, because the sealing of the respirator may be affected, qualitative fit testing shall be repeated immediately when the test subject has a:

(i) Weight change of 20 pounds or more;

(ii) Significant facial scarring in the area of the facepiece seal;

- (iii) Significant dental changes; i.e., multiple extractions without prosthesis, or acquiring dentures;
 - (iv) Reconstructive or cosmetic surgery; or
 - (v) Any other condition that may interfere with facepiece sealing.
- (4) Recordkeeping. A summary of all test results shall be maintained by the employer for 3 years. The summary shall include:
- (a) Name of test subject.
 - (b) Date of testing.
 - (c) Name of test conductor.
 - (d) Respirators selected (indicate manufacturer, model, size, and approval number).
 - (e) Testing agent.

[Statutory Authority: Chapter 49.17 RCW. 96-09-030, § 296-62-07668, filed 4/10/96, effective 6/1/96; 93-04-111 (Order 92-15), § 296-62-07668, filed 2/3/93, effective 3/15/93.]

WAC 296-62-07670 Appendix E-1-c—Irritant fume protocol. (1) Respirator selection. Respirators shall be selected as described in WAC 296-62-07666(2), except that each respirator shall be equipped with a combination of high-efficiency and acid-gas cartridges.

(2) Fit test.

(a) The test subject shall be allowed to smell a weak concentration of the irritant smoke to familiarize the subject with the characteristic odor.

(b) The test subject shall properly don the respirator selected as above, and wear it for at least 10 minutes before starting the fit test.

(c) The test conductor shall review this protocol with the test subject before testing.

(d) The test subject shall perform the conventional positive-pressure and negative-pressure fit checks (see ANSI Z88.2 1980). Failure of either check shall be cause to select an alternate respirator.

(e) Break both ends of a ventilation smoke tube containing stannic oxychloride, such as the MSA part #5645, or equivalent. Attach a short length of tubing to one end of the smoke tube. Attach the other end of the smoke tube to a low pressure air pump set to deliver 200 milliliters per minute.

(f) Advise the test subject that the smoke can be irritating to the eyes and instruct the subject to keep the eyes closed while the test is performed.

(g) The test conductor shall direct the stream of irritant smoke from the tube towards the face area of the test subject. The person conducting the test shall begin with the tube at least 12 inches from the facepiece and gradually move to within one inch, moving around the whole perimeter of the mask.

(h) The test subject shall be instructed to do the following exercises while the respirator is being challenged by the smoke. Each exercise shall be performed for one minute.

(i) Breathe normally.

(ii) Breathe deeply. Be certain breaths are deep and regular.

(iii) Turn head all the way from one side to the other. Be certain movement is complete. Inhale on each side. Do not bump the respirator against the shoulders.

(iv) Nod head up and down. Be certain motions are complete and made every second. Inhale when head is in the full up position (looking toward ceiling). Do not bump the respirator against the chest.

(v) Talking. Talk aloud and slowly for several minutes. The following paragraph is called the Rainbow Passage. Reading it will result in a wide range of facial movements, and thus be useful to satisfy this requirement. Alternative passages which serve the same purpose may also be used.

Rainbow Passage: When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond his reach, his friends say he is looking for the pot of gold at the end of the rainbow.

(vi) Jogging in place.

(vii) Breathe normally.

(i) The test subject shall indicate to the test conductor if the irritant smoke is detected. If smoke is detected, the test conductor shall stop the test. In this case, the tested respirator is rejected and another respirator shall be selected.

(j) Each test subject passing the smoke test (i.e., without detecting the smoke) shall be given a sensitivity check of smoke from the same tube to determine if the test subject reacts to the smoke. Failure to evoke a response shall void the fit test.

(k) Subdivisions (d), (i), and (j) of this subsection of this fit test protocol shall be performed in a location with exhaust ventilation sufficient to prevent general contamination of the testing area by the test agents.

(l) Respirators successfully tested by the protocol may be used in contaminated atmospheres up to ten times the PEL of MDA.

(m) The test shall not be conducted if there is any hair growth between the skin and the facepiece sealing surface.

(n) If hair growth or apparel interfere with a satisfactory fit, then they shall be altered or removed so as to eliminate interference and allow a satisfactory fit. If a satisfactory fit is still not attained, the test subject must use a positive-pressure respirator such as powered air-purifying respirators, supplied air respirator, or self-contained breathing apparatus.

(o) If a test subject exhibits difficulty in breathing during the tests, she or he shall be referred to a physician trained in respiratory diseases or pulmonary medicine to determine whether the test subject can wear a respirator while performing her or his duties.

(p) Qualitative fit testing shall be repeated at least every 12 months.

(q) In addition, because the sealing of the respirator may be affected, qualitative fit testing shall be repeated immediately when the test subject has a:

(i) Weight change of 20 pounds or more;

(ii) Significant facial scarring in the area of the facepiece seal;

(iii) Significant dental changes; i.e., multiple extractions without prosthesis, or acquiring dentures;

(iv) Reconstructive or cosmetic surgery; or

(v) Any other condition that may interfere with face-piece sealing.

(3) Recordkeeping. A summary of all test results shall be maintained by the employer for 3 years. The summary shall include:

- (a) Name of test subject.
- (b) Date of testing.
- (c) Name of test conductor.
- (d) Respirators selected (indicate manufacturer, model, size, and approval number).
- (e) Testing agent.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-62-07670, filed 2/3/93, effective 3/15/93.]

WAC 296-62-07672 Appendix E-2—Quantitative fit test procedures. (1) General.

(a) The method applies to the negative-pressure non-powered air-purifying respirators only.

(b) The employer shall assign an individual (with help as needed) who shall assume the full responsibility for implementing the respirator quantitative fit test program.

(2) Definition.

(a) "Quantitative fit test" means the measurement of the effectiveness of a respirator seal in excluding the ambient atmosphere. The test is performed by dividing the measured concentration of challenge agent in a test chamber by the measured concentration of the challenge agent inside the respirator facepiece when the normal air-purifying element has been replaced by an essentially perfect purifying element.

(b) "Challenge agent" means the air contaminant introduced into a test chamber so that its concentration inside and outside the respirator may be compared.

(c) "Test subject" means the person wearing the respirator for quantitative fit testing.

(d) "Normal standing position" means standing erect and straight with arms down along the sides and looking straight ahead.

(e) "Fit factor" means the ratio of challenge agent concentration outside with respect to the inside of a respirator inlet covering (facepiece or enclosure).

(3) Apparatus.

(a) Instrumentation. Corn oil, sodium chloride, or other appropriate aerosol generation, dilution, and measurement systems shall be used for quantitative fit test.

(b) Test chamber. The test chamber shall be large enough to permit all test subjects to freely perform all required exercises without distributing the challenge agent concentration or the measurement apparatus. The test chamber shall be equipped and constructed so that the challenge agent is effectively isolated from the ambient air yet uniform in concentration throughout the chamber.

(c) When testing air-purifying respirators, the normal filter or cartridge element shall be replaced with a high-efficiency particulate filter supplied by the same manufacturer.

(d) The sampling instrument shall be selected so that a strip chart record may be made of the test showing the rise and fall of challenge agent concentration with each inspiration and expiration at fit factors of at least 2,000.

(e) The combination of substitute air-purifying elements (if any), challenge agent, and challenge agent concentration in the test chamber shall be such that the test subject is not exposed in excess of PEL to the challenge agent at any time during the testing process.

(f) The sampling port on the test specimen respirator shall be placed and constructed so that there is no detectable leak around the port, a free air flow is allowed into the sampling line at all times, and so there is no interference with the fit or performance of the respirator.

(g) The test chamber and test set-up shall permit the person administering the test to observe one test subject inside the chamber during the test.

(h) The equipment generating the challenge atmosphere shall maintain the concentration of challenge agent constant within a 10 percent variation for the duration of the test.

(i) The time lag (interval between an event and its being recorded on the strip chart) of the instrumentation may not exceed 2 seconds.

(j) The tubing for the test chamber atmosphere and for the respirator sampling port shall be the same diameter, length, and material. It shall be kept as short as possible. The smallest diameter tubing recommended by the manufacturer shall be used.

(k) The exhaust flow from the test chamber shall pass through a high-efficiency filter before release to the room.

(l) When sodium chloride aerosol is used, the relative humidity inside the test chamber shall not exceed 50 percent.

(4) Procedural requirements.

(a) The fitting of half-mask respirators should be started with those having multiple sizes and a variety of interchangeable cartridges and canisters such as the MSA Comfr II-M, Norton M, Survivair M A-O M, or Scott-M. Use either of the tests outlined below to assure that the facepiece is properly adjusted.

(i) Positive-pressure test. With the exhaust port(s) blocked the negative pressure of slight inhalation should remain constant for several seconds.

(ii) Negative-pressure test. With the intake port(s) blocked the negative pressure slight inhalation should remain constant for several seconds.

(b) After a facepiece is adjusted, the test subject shall wear the facepiece for at least 5 minutes before conducting a qualitative test by using either of the methods described below and using the exercise regime described in subsection (5), subdivisions (a) through (e).

(i) Isoamyl acetate test. When using organic vapor cartridges, the test subject who can smell the odor should be unable to detect the odor of isoamyl acetate squirted into the air near the most vulnerable portions of the facepiece seal. In a location which is separated from the test area, the test subject shall be instructed to close her/his eyes during the test period. A combination cartridge or canister with organic vapor and high-efficiency filters shall be used when available for the particular mask being tested. The test subject shall be given an opportunity to smell the odor of isoamyl acetate before the test is conducted.

(ii) Irritant fume test. When using high-efficiency filters, the test subject should be unable to detect the odor of irritant fume (stannic chloride or titanium tetrachloride ventilation smoke tubes) squirted into the air near the most

vulnerable portions of the facepiece seal. The test subject shall be instructed to close her/his eyes during the test period.

(c) The test subject may enter the quantitative testing chamber only if she or he has obtained a satisfactory fit as stated in subdivision (b) of this subsection.

(d) Before the subject enters the test chamber, a reasonably stable challenge agent concentration shall be measured in the test chamber.

(e) Immediately after the subject enters the test chamber, the challenge agent concentration inside the respirator shall be measured to ensure that the peak penetration does not exceed 5 percent for a half-mask and 1 percent for a full facepiece.

(f) A stable challenge agent concentration shall be obtained prior to the actual start of testing.

(g) Respirator restraining straps may not be overtightened for testing. The straps shall be adjusted by the wearer to give a reasonably comfortable fit typical of normal use.

(5) Exercise regime. Prior to entering the test chamber, the test subject shall be given complete instructions as to her/his part in the test procedures. The test subject shall perform the following exercises, in the order given, for each independent test.

(a) Normal breathing (NB). In the normal standing position, without talking, the subject shall breathe normally for at least one minute.

(b) Deep breathing (DB). In the normal standing position the subject shall do deep breathing for at least one minute pausing so as not to hyperventilate.

(c) Turning head side to side (SS). Standing in place the subject shall slowly turn his head from side between the extreme positions to each side. The head shall be held at each extreme position for at least 5 seconds. Perform for at least five complete cycles.

(d) Moving head up and down (UD). Standing in place, the subject shall slowly move his head up and down between the extreme position straight up and the extreme position straight down. The head shall be held at each extreme position for at least 5 seconds. Perform for at least five complete cycles.

(e) Reading (R). The subject shall read out slowly and loud so as to be heard clearly by the test conductor or monitor. The test subject shall read the "Rainbow Passage."

Rainbow Passage: When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond reach, his friends say he is looking for the pot of gold at the end of the rainbow.

(f) Grimace (G). The test subject shall grimace, smile, frown, and generally contort the face using the facial muscles. Continue for at least 15 seconds.

(g) Bend over and touch toes (B). The test subject shall bend at the waist and touch toes and return to upright position. Repeat for at least one minute.

(h) Jogging in place (J). The test subject shall jog in place for at least one minute.

(i) Normal breathing (NB). In the normal standing position, without talking, the subject shall breathe normally for at least one minute.

(6) Termination of tests. The test shall be terminated whenever any single peak penetration exceeds 5 percent for half-masks and 1 percent for full facepieces. The test subject may be refitted and retested. If two of the three required tests are terminated, the fit shall be deemed inadequate.

(7) Calculation of fit factors.

(a) The fit factor determined by the quantitative fit test equals the average concentration inside the respirator.

(b) The average test chamber concentration is the arithmetic average of the test chamber concentration at the beginning and of the end of the test.

(c) The average peak concentration of the challenge agent inside the respirator shall be the arithmetic average peak concentrations for each of the nine exercises of the test which are computed as the arithmetic average of the peak concentrations found for each breath during the exercise.

(d) The average peak concentration for an exercise may be determined graphically if there is not a great variation in the peak concentrations during a single exercise.

(8) Interpretation of test results. The fit factor measured by the quantitative fit testing shall be the lowest of the three protection factors resulting from three independent tests.

(9) Other requirements.

(a) The test subject shall not be permitted to wear a half-mask or full facepiece if the minimum fit factor of 250 or 1,250, respectively, cannot be obtained. If hair growth or apparel interfere with a satisfactory fit, then they shall be altered or removed so as to eliminate interference and allow a satisfactory fit. If a satisfactory fit is still not attained, the test subject must use a positive-pressure respirator such as powered air-purifying respirators, supplied air respirator, or self-contained breathing apparatus.

(b) The test shall not be conducted if there is any hair growth between the skin and the facepiece sealing surface.

(c) If a test subject exhibits difficulty in breathing during the tests, she or he shall be referred to a physician to determine whether the test subject can wear a respirator while performing her or his duties.

(d) The test subject shall be given the opportunity to wear the assigned respirator for one week. If the respirator does not provide a satisfactory fit during actual use, the test subject may request another QNFT which shall be performed immediately.

(e) A respirator fit factor card shall be issued to the subject with the following information:

(i) Name.

(ii) Date of fit test.

(iii) Protection factors obtained through each manufacturer, model and approval number of respirator tested.

(iv) Name and signature of the person that conducted the test.

(f) Filters used for qualitative or quantitative fit testing shall be replaced weekly, whenever increased breathing resistance is encountered, or when the test agent has altered the integrity of the filter media. Organic vapor cartridges/

canisters shall be replaced daily or sooner if there is any indication of breakthrough by the test agent.

(10) Retesting. In addition, because the sealing of the respirator may be affected, quantitative fit testing shall be repeated immediately when the test subject has a:

- (a) Weight change of 20 pounds or more;
- (b) Significant facial scarring in the area of the face-piece seal;
- (c) Significant dental changes; i.e., multiple extractions without prosthesis, or acquiring dentures;
- (d) Reconstructive or cosmetic surgery; or
- (e) Any other condition that may interfere with face-piece sealing.

(11) Recordkeeping.

(a) A summary of all test results shall be maintained for three years. The summary shall include:

- (i) Name of test subject.
- (ii) Date of testing.
- (iii) Name of the test conductor.
- (iv) Fit factors obtained from every respirator tested (indicate manufacturer, model, size, and approval number).

(b) A copy of all test data including the strip chart and results shall be kept for at least five years.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-62-07672, filed 2/3/93, effective 3/15/93.]

PART I-1—ASBESTOS, TREMOLITE, ANTHOPHYLLITE, AND ACTINOLITE

WAC 296-62-077 Asbestos, tremolite, anthophyllite, and actinolite.

[Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-62-077, filed 4/27/87.]

WAC 296-62-07701 Scope and application. (1) WAC 296-62-07701 through 296-62-07753 applies to all occupational exposures to asbestos in all industries covered by the Washington Industrial Safety and Health Act.

(2) This section does apply to construction work as defined in WAC 296-155-012.

(3) This section does apply to ship repairing, shipbuilding and shipbreaking employments and related employments as defined in WAC 296-304-01001.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 97-01-079, § 296-62-07701, filed 12/17/96, effective 3/1/97. Statutory Authority: Chapter 49.17 RCW. 87-24-051 (Order 87-24), § 296-62-07701, filed 11/30/87. Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-62-07701, filed 4/27/87.]

WAC 296-62-07703 Definitions. For the purpose of WAC 296-62-07701 through 296-62-07753:

Accredited inspector means any person meeting the accreditation requirements of the Federal Toxic Substance Control Act, Section 206(a)(1) and (3). 15 U.S.C. 2646(a)(1) and (3).

Aggressive method means removal or disturbance of building material by sanding, abrading, grinding or other method that breaks, crumbles, or disintegrates intact ACM.

Amended water means water to which surfactant (wetting agent) has been added to increase the ability of the liquid to penetrate ACM.

Asbestos includes chrysotile, amosite, crocidolite, tremolite asbestos, anthophyllite asbestos, actinolite asbestos, and any of these minerals that have been chemically treated and/or altered.

For purposes of this standard, "asbestos" includes PACM, as defined below.

Asbestos abatement project means an asbestos project involving three square feet or three linear feet, or more, of asbestos-containing material.

Asbestos-containing material (ACM) means any material containing more than 1% asbestos.

Asbestos project - definition as stated in WAC 296-65-003.

Authorized person means any person authorized by the employer and required by work duties to be present in regulated areas.

Building/facility/vessel owner means any legal entity or person who owns any public or private building, vessel, structure, facility, or mechanical system or the remnants thereof, including the agent of such person, but does not include individuals who work on asbestos projects in their own single-family residences, no part of which is used for commercial purposes. Also included is any lessee, who exercises control over management and recordkeeping functions relating to a building, vessel, and/or facility in which activities covered by this standard takes place.

Certified asbestos supervisor means an individual certified by the department under WAC 296-65-012.

Certified asbestos worker means an individual certified by the department under WAC 296-65-010.

Certified industrial hygienist (CIH) means one certified in the practice of industrial hygiene by the American Board of Industrial Hygiene.

Class I asbestos work means activities involving the removal of thermal system insulation or surfacing ACM/PACM.

Class II asbestos work means activities involving the removal of ACM which is not thermal system insulation or surfacing material. This includes, but is not limited to, the removal of asbestos-containing wallboard, floor tile and sheeting, roofing and siding shingles, and construction mastics.

Class III asbestos work means repair and maintenance operations where "ACM," including TSI and surfacing ACM and PACM, may be disturbed.

Class IV asbestos work means maintenance and custodial activities during which employees contact but do not disturb ACM or PACM and activities to clean up dust, waste and debris resulting from Class I, II, and III activities.

Clean room means an uncontaminated room having facilities for the storage of employees' street clothing and uncontaminated materials and equipment.

Closely resemble means that the major workplace conditions which have contributed to the levels of historic asbestos exposure, are no more protective than conditions of the current workplace.

Competent person means, in addition to the definition in WAC 296-62-07728, one who is capable of identifying

existing asbestos, hazards in the workplace and selecting the appropriate control strategy for asbestos exposure, who has the authority to take prompt corrective measures to eliminate them as specified in WAC 296-62-07728. The competent person shall be certified as an asbestos supervisor in compliance with WAC 296-65-030(3) and 296-65-012 for Class I and Class II work, and for Class III and Class IV work involving 3 square feet or 3 linear feet or more of asbestos-containing material. For Class III and Class IV work, involving less than 3 square feet or 3 linear feet, the competent person shall be trained in an operations and maintenance (O&M) course which meets the criteria of EPA (40 CFR 763.92(a)(2)).

Critical barrier means one or more layers of plastic sealed over all openings into a work area or any other similarly placed physical barrier sufficient to prevent airborne asbestos in a work area from migrating to an adjacent area.

Decontamination area means an enclosed area adjacent and connected to the regulated area and consisting of an equipment room, shower area, and clean room, which is used for the decontamination of workers, materials, and equipment contaminated with asbestos.

Demolition means the wrecking or taking out of any load-supporting structural member and any related razing, removing, or stripping of asbestos products. Where feasible, asbestos-containing materials shall be removed from all structures prior to the commencement of any demolition activity as per WAC 296-155-775(9).

Department means the department of labor and industries.

Director means the director of the department of labor and industries or his/her authorized representative.

Director of NIOSH means the Director, National Institute for Occupational Safety and Health, U.S. Department of Health and Human Services, or designee.

Disturbance means activities that disrupt the matrix of ACM or PACM, crumble or pulverize ACM or PACM, or generate visible debris from ACM or PACM. This term includes activities that disrupt the matrix of ACM or PACM, render ACM or PACM friable, or generate visible debris. Disturbance includes cutting away small amounts of ACM or PACM, no greater than the amount which can be contained in one standard size glove bag or waste bag in order to access a building or vessel component. In no event shall the amount of ACM or PACM so disturbed exceed that which can be contained in one glove bag or waste bag which shall not exceed 60 inches in length and width.

Employee exposure means that exposure to airborne asbestos that would occur if the employee were not using respiratory protective equipment.

Equipment room(change room) means a contaminated room located within the decontamination area that is supplied with impermeable bags or containers for the disposal of contaminated protective clothing and equipment.

Fiber means a particulate form of asbestos, five micrometers or longer, with a length-to-diameter ratio of at least three to one.

Glove bag means not more than a 60 x 60 inch impervious plastic bag-like enclosure affixed around an asbestos-

containing material, with glove-like appendages through which material and tools may be handled.

High-efficiency particulate air (HEPA) filter means a filter capable of trapping and retaining at least 99.97 percent of all monodispersed particles of 0.3 micrometers mean aerodynamic diameter or larger.

Homogeneous area means an area of surfacing material or thermal system insulation that is uniform in color and texture.

Industrial hygienist means a professional qualified by education, training, and experience to anticipate, recognize, evaluate and develop controls for occupational health hazards.

Intact means that the ACM has not crumbled, been pulverized, or otherwise deteriorated so that the asbestos is no longer likely to be bound with its matrix.

Modification for the purpose of WAC 296-62-07712 means a changed or altered procedure, material or component of a control system, which replaces a procedure, material or component of a required system. Omitting a procedure or component, or reducing or diminishing the stringency or strength of a material or component of the control system is not a "modification" for the purposes of WAC 296-62-07712.

Negative initial exposure assessment means a demonstration by the employer (which complies with the criteria in WAC 296-62-07709) that employee exposure during an operation is expected to be consistently below the PELs.

PACM means "presumed asbestos-containing material."

Presumed asbestos-containing material means thermal system insulation and surfacing material found in buildings, vessels, and vessel sections constructed no later than 1980. The designation of a material as "PACM" may be rebutted pursuant to WAC 296-62-07721.

Project designer means a person who has successfully completed the training requirements for an abatement project designer established by 40 U.S.C. 763.90(g).

Regulated area means an area established by the employer to demarcate areas where Class I, II, and III asbestos work is conducted, and any adjoining area where debris and waste from such asbestos work accumulate; and a work area within which airborne concentrations of asbestos, exceed or can reasonably be expected to exceed the permissible exposure limit. Requirements for regulated areas are set out in WAC 296-62-07711.

Removal means all operations where ACM and/or PACM is taken out or stripped from structures or substrates, and includes demolition operations.

Renovation means the modifying of any existing vessel, vessel section, structure, or portion thereof.

Repair means overhauling, rebuilding, reconstructing, or reconditioning of vessels, vessel sections, structures or substrates, including encapsulation or other repair of ACM or PACM attached to vessels, vessel sections, structures or substrates.

Surfacing material means material that is sprayed, troweled-on or otherwise applied to surfaces (such as acoustical plaster on ceilings and fireproofing materials on structural members, or other materials on surfaces for acoustical, fireproofing, and other purposes).

Surfacing ACM means surfacing material which contains more than 1% asbestos.

Thermal system insulation (TSI) means ACM applied to pipes, fittings, boilers, breaching, tanks, ducts, or other structural components to prevent heat loss or gain.

Thermal system insulation ACM is thermal system insulation which contains more than 1% asbestos.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 97-01-079, § 296-62-07703, filed 12/17/96, effective 3/1/97. Statutory Authority: Chapter 49.17 RCW. 89-21-018 (Order 89-10), § 296-62-07703, filed 10/10/89, effective 11/24/89; 89-11-035 (Order 89-03), § 296-62-07703, filed 5/15/89, effective 6/30/89; 87-24-051 (Order 87-24), § 296-62-07703, filed 11/30/87. Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-62-07703, filed 4/27/87.]

WAC 296-62-07705 Permissible exposure limits (PEL). (1) Time weighted average (TWA). The employer shall ensure that no employee is exposed to an airborne concentration of asbestos in excess of 0.1 fiber per cubic centimeter (0.1 f/cc) of air as an eight-hour time-weighted average (TWA) as determined by the method prescribed in Appendix A of this part, or by an equivalent method recognized by the department.

(2) Excursion limit. The employer shall ensure that no employee is exposed to an airborne concentration of asbestos in excess of 1.0 fiber per cubic centimeter of air (1 f/cc) as averaged over a sampling period of thirty minutes, as determined by the method prescribed in Appendix A of this part, or by an equivalent method recognized by the department.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 97-01-079, § 296-62-07705, filed 12/17/96, effective 3/1/97. Statutory Authority: Chapter 49.17 RCW. 89-11-035 (Order 89-03), § 296-62-07705, filed 5/15/89, effective 6/30/89; 87-24-051 (Order 87-24), § 296-62-07705, filed 11/30/87. Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-62-07705, filed 4/27/87.]

WAC 296-62-07706 Multi-employer worksites. (1) On multi-employer worksites, an employer performing work requiring the establishment of a regulated area shall inform other employers on the site of the nature of the employer's work with asbestos and/or PACM, of the existence of and requirements pertaining to regulated areas, and the measures taken to ensure that employees of such other employers are not exposed to asbestos.

(2) Asbestos hazards at a multi-employer worksite shall be abated by the employer who created or controls the source of asbestos contamination. For example, if there is a significant breach of an enclosure containing Class I work, the employer responsible for erecting the enclosure shall repair the breach immediately.

(3) In addition, all employers of employees exposed to asbestos hazards shall comply with applicable protective provisions to protect their employees. For example, if employees working immediately adjacent to a Class I asbestos job are exposed to asbestos due to the inadequate containment of such jobs, their employer shall either remove the employees from the area until the enclosure breach is repaired; or perform an initial exposure assessment pursuant to WAC 296-62-07709.

(4) All employers of employees working adjacent to regulated areas established by another employer on a

multi-employer worksite, shall take steps on a daily basis to ascertain the integrity of the enclosure and/or the effectiveness of the control method relied on by the primary asbestos contractor to assure that asbestos fibers do not migrate to such adjacent areas.

(5) All general contractors on a construction project which includes work covered by this standard shall be deemed to exercise general supervisory authority over the work covered by this standard, even though the general contractor is not qualified to serve as the asbestos "competent person" as defined by WAC 296-62-07703. As supervisor of the entire project, the general contractor shall ascertain whether the asbestos contractor is in compliance with this standard, and shall require such contractor to come into compliance with this standard when necessary.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 97-01-079, § 296-62-07706, filed 12/17/96, effective 3/1/97. Statutory Authority: Chapter 49.17 RCW. 94-16-145, § 296-62-07706, filed 8/3/94, effective 9/12/94; 87-24-051 (Order 87-24), § 296-62-07706, filed 11/30/87.]

WAC 296-62-07709 Exposure assessment and monitoring. (1) General monitoring criteria.

(a) Each employer who has a workplace or work operation where exposure monitoring is required under this section shall perform monitoring to determine accurately the airborne concentrations of asbestos to which employees may be exposed.

(b) Determinations of employee exposure shall be made from breathing zone air samples that are representative of the eight-hour TWA and thirty minute short-term exposures of each employee.

(c) Representative eight-hour TWA employee exposures shall be determined on the basis of one or more samples representing full-shift exposure for each shift for each employee in each job classification in each work area.

(d) Representative thirty minute short-term employee exposures shall be determined on the basis of one or more samples representing thirty minute exposures associated with operations that are most likely to produce exposures above the excursion limit for each shift for each job classification in each work area.

(2) Exposure monitoring requirements for all occupational exposures to asbestos in all industries covered by the Washington Industrial Safety and Health Act except construction work, as defined in WAC 296-155-012, and except ship repairing, shipbuilding and shipbreaking employments and related employments as defined in WAC 296-304-01001.

(a) Initial monitoring.

(i) Each employer who has a workplace or work operation covered by this standard, except as provided for in (a)(ii) and (iii) of this subsection, shall perform initial monitoring of employees who are, or may reasonably be expected to be exposed to airborne concentrations at or above the TWA permissible exposure limit and/or excursion limit. The initial monitoring shall be at the initiation of each asbestos job to accurately determine the airborne concentration of asbestos to which employees may be exposed.

(ii) Where the employer or his/her representative has monitored after March 31, 1992, for the TWA permissible exposure limit and/or excursion limit, and the monitoring satisfies all other requirements of this section, and the

monitoring data was obtained during work operations conducted under workplace conditions closely resembling the processes, type of material including percentage of asbestos, control methods, work practices, and environmental conditions used and prevailing in the employer's current operations, the employer may rely on such earlier monitoring results to satisfy the requirements of (a)(i) of this subsection.

(iii) Where the employer has relied upon objective data that demonstrates that asbestos is not capable of being released in airborne concentrations at or above the TWA permissible exposure limit and/or excursion limit under those work conditions of processing, use, or handling expected to have the greatest potential for releasing asbestos, then no initial monitoring is required.

(b) Monitoring frequency (periodic monitoring) and patterns. After the initial determinations required by subsection (2)(a)(i) of this section, samples shall be of such frequency and pattern as to represent with reasonable accuracy the levels of exposure of the employees. In no case shall sampling be at intervals greater than six months for employees whose exposures may reasonably be foreseen to exceed the TWA permissible exposure limit and/or excursion limit.

(c) Daily monitoring within regulated areas: The employer shall conduct daily monitoring that is representative of the exposure of each employee who is assigned to work within a regulated area. Exception: When all employees within a regulated area are equipped with full facepiece supplied-air respirators operated in the pressure-demand mode equipped with either an auxiliary positive pressure self-contained breathing apparatus or a HEPA filter, the employer may dispense with the daily monitoring required by this subsection.

(d) Changes in monitoring frequency. If either the initial or the periodic monitoring required by subsection (2)(a) and (b) of this section statistically indicates that employee exposures are below the TWA permissible exposure limit and/or excursion limit, the employer may discontinue the monitoring for those employees whose exposures are represented by such monitoring.

(e) Additional monitoring. Notwithstanding the provisions of subsection (2)(a)(ii) and (c) of this section, the employer shall institute the exposure monitoring required under subsection (2)(a)(i) and (ii) of this section whenever there has been a change in the production, process, control equipment, personnel, or work practices that may result in new or additional exposures above the TWA permissible exposure limit and/or excursion limit, or when the employer has any reason to suspect that a change may result in new or additional exposures above the TWA permissible exposure limit and/or excursion limit.

(3) Exposure assessment monitoring requirements for all construction work as defined in WAC 296-155-012 and for all ship repairing, shipbuilding and shipbreaking employments and related employments as defined in WAC 296-304-01001.

(a) Initial exposure assessment.

(i) Each employer who has a workplace or work operation covered by this standard shall ensure that a "competent person" conducts an exposure assessment immediately before or at the initiation of the operation to

ascertain expected exposures during that operation or workplace. The assessment must be completed in time to comply with the requirements which are triggered by exposure data or lack of a "negative exposure assessment," and to provide information necessary to assure that all control systems planned are appropriate for that operation and will work properly.

(ii) Basis of initial exposure assessment: Unless a negative exposure assessment has been made pursuant to (b) of this subsection, the initial exposure assessment shall, if feasible, be based on monitoring conducted pursuant to (b) of this subsection. The assessment shall take into consideration both the monitoring results and all observations, information or calculations which indicate employee exposure to asbestos, including any previous monitoring conducted in the workplace, or of the operations of the employer which indicate the levels of airborne asbestos likely to be encountered on the job. For Class I asbestos work, until the employer conducts exposure monitoring and documents that employees on that job will not be exposed in excess of the PELs, or otherwise makes a negative exposure assessment pursuant to (b) of this subsection, the employer shall presume that employees are exposed in excess of the TWA and excursion limit.

(b) Negative exposure assessment: For any one specific asbestos job which will be performed by employees who have been trained in compliance with the standard, the employer may demonstrate that employee exposures will be below the PELs by data which conform to the following criteria:

(i) Objective data demonstrating that the products or material containing asbestos minerals or the activity involving such product or material cannot release airborne fibers in concentrations exceeding the TWA and excursion limit under those work conditions having the greatest potential for releasing asbestos; or

(ii) Where the employer has monitored prior asbestos jobs for the PEL and the excursion limit within 12 months of the current or projected job, the monitoring and analysis were performed in compliance with the asbestos standard in effect; and the data was obtained during work operations conducted under workplace conditions "closely resembling" the processes, type of material including percentage of asbestos, control methods, work practices, and environmental conditions used and prevailing in the employer's current operations, the operations were conducted by employees whose training and experience are no more extensive than that of employees performing the current job, and these data show that under the conditions prevailing and which will prevail in the current workplace there is a high degree of certainty that employee exposures will not exceed the TWA or excursion limit; or

(iii) The results of initial exposure monitoring of the current job made from breathing zone samples that are representative of the 8-hour TWA and 30-minute short-term exposures of each employee covering operations which are most likely during the performance of the entire asbestos job to result in exposures over the PELs; or

(iv) Monitoring outside negative-pressure enclosures: The employer shall conduct representative area monitoring of the airborne fiber levels at least every other day at the

HEPA machine exhaust and entrance to the decontamination area.

(c) Periodic monitoring.

(i) Class I and Class II operations. The employer shall conduct daily monitoring that is representative of the exposure of each employee who is assigned to work within a regulated area who is performing Class I or II work, unless the employer pursuant to (b) of this subsection, has made a negative exposure assessment for the entire operation.

(ii) All operations under the standard other than Class I and II operations. The employer shall conduct periodic monitoring of all work where exposures are expected to exceed a PEL, at intervals sufficient to document the validity of the exposure prediction.

(iii) Exception. When all employees required to be monitored daily are equipped with supplied-air respirators operated in the pressure demand mode, the employer may dispense with the daily monitoring required by subsection (2)(c) of this section. However, employees performing Class I work using a control method which is not listed in WAC 296-62-07712 of this section or using a modification of a listed control method, shall continue to be monitored daily even if they are equipped with supplied-air respirators.

(d) Termination of monitoring. If the periodic monitoring required by (c) of this subsection reveals that employee exposures, as indicated by statistically reliable measurements, are below the permissible exposure limit and excursion limit the employer may discontinue monitoring for those employees whose exposures are represented by such monitoring.

(e) Additional monitoring. Notwithstanding the provisions of (b), (c), and (d) of this subsection, the employer shall institute the exposure monitoring required under (c) of this subsection whenever there has been a change in process, control equipment, personnel or work practices that may result in new or additional exposures above the permissible exposure limit and/or excursion limit or when the employer has any reason to suspect that a change may result in new or additional exposures above the permissible exposure limit and/or excursion limit. Such additional monitoring is required regardless of whether a "negative exposure assessment" was previously produced for a specific job.

(f) Prior to the start of the removal, demolition, or renovation project, representative area monitoring shall be conducted for later use (see WAC 296-62-07712 (5)(c)).

(4) Method of monitoring.

(a) All samples taken to satisfy the monitoring requirements of this section shall be personal samples collected following the procedures specified in WAC 296-62-07735, Appendix A.

(b) Monitoring shall be performed by persons having a thorough understanding of monitoring principles and procedures and who can demonstrate proficiency in sampling techniques.

(c) All samples taken to satisfy the monitoring requirements of this section shall be evaluated using the WISHA reference method specified in WAC 296-62-07735, Appendix A, or an equivalent counting method recognized by the department.

(d) If an equivalent method to the WISHA reference method is used, the employer shall ensure that the method meets the following criteria:

(i) Replicate exposure data used to establish equivalency are collected in side-by-side field and laboratory comparisons; and

(ii) The comparison indicates that ninety percent of the samples collected in the range 0.5 to 2.0 times the permissible limit have an accuracy range of plus or minus twenty-five percent of the WISHA reference method results at a ninety-five percent confidence level as demonstrated by a statistically valid protocol; and

(iii) The equivalent method is documented and the results of the comparison testing are maintained.

(e) To satisfy the monitoring requirements of this section, employers must use the results of monitoring analysis performed by laboratories which have instituted quality assurance programs that include the elements as prescribed in WAC 296-62-07735, Appendix A.

(5) Employee notification of monitoring results.

(a) The employer shall, as soon as possible but no later than within fifteen working days after the receipt of the results of any monitoring performed under the standard, notify the affected employees of these results in writing either individually or by posting of results in an appropriate location that is accessible to affected employees.

(b) The written notification required by (a) of this subsection shall contain the corrective action being taken by the employer to reduce employee exposure to or below the TWA and/or excursion exposure limits, wherever monitoring results indicated that the TWA and/or excursion exposure limits had been exceeded.

(6) Observation of monitoring.

(a) The employer shall provide affected employees or their designated representatives an opportunity to observe any monitoring of employee exposure to asbestos conducted in accordance with this section.

(b) When observation of the monitoring of employee exposure to asbestos requires entry into an area where the use of protective clothing or equipment is required, the observer shall be provided with and be required to use such clothing and equipment and shall comply with all other applicable safety and health procedures.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 97-01-079, § 296-62-07709, filed 12/17/96, effective 3/1/97. Statutory Authority: Chapter 49.17 RCW. 89-11-035 (Order 89-03), § 296-62-07709, filed 5/15/89, effective 6/30/89; 87-24-051 (Order 87-24), § 296-62-07709, filed 11/30/87. Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-62-07709, filed 4/27/87.]

WAC 296-62-07711 Regulated areas. (1) General. The employer shall establish a regulated area in work areas where airborne concentrations of asbestos exceed or can reasonably be expected to exceed the permissible exposure limits prescribed in WAC 296-62-07705. All Class I, II and III asbestos work shall be conducted within regulated areas. All other operations covered by this standard shall be conducted within the regulated area where airborne concentrations of asbestos exceed or can reasonably be expected to exceed permissible exposure limits. Regulated areas shall comply with the requirements of subsections (2), (3), (4), (5), (6), (7), and (8) of this section.

(2) Demarcation. The regulated area shall be demarcated in any manner that minimizes the number of persons

within the area and protects persons outside the area from exposure to airborne asbestos. Where critical barriers or negative pressure enclosures are used, they may demarcate the regulated area. Signs shall be provided and displayed pursuant to the requirements of WAC 296-62-07721.

(3) Access. Access to regulated areas shall be limited to authorized persons or to persons authorized by the Washington Industrial Safety and Health Act or regulations issued pursuant thereto.

(4) Provision of respirators. Each person entering a regulated area shall be supplied with and required to use a respirator, selected in accordance with WAC 296-62-07715.

(5) Protective clothing. All persons entering a regulated area shall be supplied with and required to wear protective clothing, selected in accordance with WAC 296-62-07717.

(6) Prohibited activities. The employer shall ensure that employees do not eat, drink, smoke, chew tobacco or gum, or apply cosmetics in the regulated areas.

(7) Permit-required confined space. The employer shall determine if a permit-required confined space hazard exists and shall take any necessary precautions in accordance with chapter 296-62 WAC Part M.

(8) Competent persons. For construction and shipyard work the employer shall ensure that all asbestos work performed within regulated areas is supervised by a competent person, as defined in WAC 296-62-07703. The duties of the competent person are set out in WAC 296-62-07728.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 97-01-079, § 296-62-07711, filed 12/17/96, effective 3/1/97. Statutory Authority: Chapter 49.17 RCW. 95-04-007, § 296-62-07711, filed 1/18/95, effective 3/1/95; 93-19-142 (Order 93-04), § 296-62-07711, filed 9/22/93, effective 11/1/93; 89-11-035 (Order 89-03), § 296-62-07711, filed 5/15/89, effective 6/30/89; 87-24-051 (Order 87-24), § 296-62-07711, filed 11/30/87. Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-62-07711, filed 4/27/87.]

WAC 296-62-07712 Requirements for asbestos activities in construction and shipyard work. (1) Methods of compliance, the following engineering controls and work practices of this section shall be used for construction work defined in WAC 296-155-012 and for all ship repair defined in WAC 296-304-010.

(2) Engineering controls and work practices for all operations covered by this section. The employer shall use the following engineering controls and work practices in all operations covered by this section, regardless of the levels of exposure:

(a) Vacuum cleaners equipped with HEPA filters to collect all debris and dust containing ACM and PACM, except as provided in subsection (10)(b) of this section in the case of roofing material.

(b) Wet methods, or wetting agents, to control employee exposures during asbestos handling, mixing, removal, cutting, application, and cleanup, except where employers demonstrate that the use of wet methods is infeasible due to, for example, the creation of electrical hazards, equipment malfunction, and, in roofing, except as provided in subsection (10)(b) of this section.

(c) Asbestos shall be handled, mixed, applied, removed, cut, scored, or otherwise worked in a wet saturated state to prevent the emission of airborne fibers unless the usefulness of the product would be diminished thereby.

(d) Prompt cleanup and disposal of wastes and debris contaminated with asbestos in leak-tight containers except in roofing operations, where the procedures specified in this section apply.

(3) In addition to the requirements of subsection (2) of this section, the employer shall use the following control methods to achieve compliance with the TWA permissible exposure limit and excursion limit prescribed by WAC 296-62-07705:

(a) Local exhaust ventilation equipped with HEPA filter dust collection systems;

(b) Enclosure or isolation of processes producing asbestos dust;

(c) Ventilation of the regulated area to move contaminated air away from the breathing zone of employees and toward a filtration or collection device equipped with a HEPA filter;

(d) Use of other work practices and engineering controls that the department can show to be feasible;

(e) Wherever the feasible engineering and work practice controls described above are not sufficient to reduce employee exposure to or below the permissible exposure limit and/or excursion limit prescribed in WAC 296-62-07705, the employer shall use them to reduce employee exposure to the lowest levels attainable by these controls and shall supplement them by the use of respiratory protection that complies with the requirements of WAC 296-62-07715.

(4) Prohibitions. The following work practices and engineering controls shall not be used for work related to asbestos or for work which disturbs ACM or PACM, regardless of measured levels of asbestos exposure or the results of initial exposure assessments:

(a) High-speed abrasive disc saws that are not equipped with point or cut ventilator or enclosures with HEPA filtered exhaust air;

(b) Compressed air used to remove asbestos, or materials containing asbestos, unless the compressed air is used in conjunction with an enclosed ventilation system designed to capture the dust cloud created by the compressed air;

(c) Dry sweeping, shoveling or other dry cleanup of dust and debris containing ACM and PACM;

(d) Employee rotation as a means of reducing employee exposure to asbestos.

(5) Cleanup.

(a) After completion of asbestos removal, demolition, and renovation operations, all surfaces in and around the work area shall be cleared of any asbestos debris.

(b) Lock-down. Where asbestos has been removed, encapsulant shall be applied to ensure binding of remaining fibers.

(c) The employer shall demonstrate by monitoring that the airborne fiber concentration is below the permissible exposure limits; or, at or below the airborne fiber level existing prior to the start of the removal, demolition, or renovation project; whichever level is lower.

(6) Class I requirements. The following engineering controls and work practices and procedures shall be used:

(a) All Class I work, including the installation and operation of the control system shall be supervised by a competent person as defined in WAC 296-62-07703;

(b) For all Class I jobs involving the removal of more than 25 linear or 10 square feet of thermal system insulation or surfacing material; for all other Class I jobs, where the employer cannot produce a negative exposure assessment pursuant to WAC 296-62-07709(3), or where employees are working in areas adjacent to the regulation area, while the Class I work is being performed, the employer shall use one of the following methods to ensure that airborne asbestos does not migrate from the regulated area:

(i) Critical barriers shall be placed over all the openings to the regulated area, except where activities are performed outdoors; or

(ii) The employer shall use another barrier or isolation method which prevents the migration of airborne asbestos from the regulated area, as verified by perimeter area surveillance during each work shift at each boundary of the regulated area, showing no visible asbestos dust; and perimeter area monitoring showing that clearance levels contained in 40 CFR Part 763, Subpart E, of the EPA Asbestos in Schools Rule are met, or that perimeter area levels, measured by Phase Contrast Microscopy (PCM) are no more than background levels representing the same area before the asbestos work began. The results of such monitoring shall be made known to the employer no later than 24 hours from the end of the work shift represented by such monitoring. Exception: For work completed outdoors where employees are not working in areas adjacent to the regulated areas, (a) of this subsection is satisfied when the specific control methods in subsection (7) of this section are used;

(c) For all Class I jobs, HVAC systems shall be isolated in the regulated area by sealing with a double layer of 6 mil plastic or the equivalent;

(d) For all Class I jobs, impermeable dropcloths shall be placed on surfaces beneath all removal activity;

(e) For all Class I jobs, all objects within the regulated area shall be covered with impermeable dropcloths or plastic sheeting which is secured by duct tape or an equivalent;

(f) For all Class I jobs where the employer cannot produce a negative exposure assessment, or where exposure monitoring shows that a PEL is exceeded, the employer shall ventilate the regulated area to move contaminated air away from the breathing zone of employees toward a HEPA filtration or collection device.

(7) Specific control methods for Class I work. In addition, Class I asbestos work shall be performed using one or more of the following control methods pursuant to the limitations stated below:

(a) Negative pressure enclosure (NPE) systems: NPE systems may be used where the configuration of the work area does not make the erection of the enclosure infeasible, with the following specifications and work practices:

(i) Specifications:

(A) The negative pressure enclosure (NPE) may be of any configuration;

(B) At least 4 air changes per hour shall be maintained in the NPE;

(C) A minimum of -0.02 column inches of water pressure differential, relative to outside pressure, shall be maintained within the NPE as evidenced by manometric measurements;

(D) The NPE shall be kept under negative pressure throughout the period of its use; and

(E) Air movement shall be directed away from employees performing asbestos work within the enclosure, and toward a HEPA filtration or collection device.

(ii) Work practices:

(A) Before beginning work within the enclosure and at the beginning of each shift, the NPE shall be inspected for breaches and smoke-tested for leaks, and any leaks sealed.

(B) Electrical circuits in the enclosure shall be deactivated, unless equipped with ground-fault circuit interrupters.

(b) Glove bag systems may be used to remove PACM and/or ACM from straight runs of piping and elbows and other connections with the following specifications and work practices:

(i) Specifications:

(A) Glove bags shall be made of 6 mil thick plastic and shall be seamless at the bottom.

(B) Glove bags used on elbows and other connections must be designed for that purpose and used without modifications.

(ii) Work practices:

(A) Each glove bag shall be installed so that it completely covers the circumference of pipe or other structure where the work is to be done.

(B) Glove bags shall be smoke-tested for leaks and any leaks sealed prior to use.

(C) Glove bags may be used only once and may not be moved.

(D) Glove bags shall not be used on surfaces whose temperature exceeds 150°F.

(E) Prior to disposal, glove bags shall be collapsed by removing air within them using a HEPA vacuum.

(F) Before beginning the operation, loose and friable material adjacent to the glove bag/box operation shall be wrapped and sealed in two layers of six mil plastic or otherwise rendered intact.

(G) Where system uses attached waste bag, such bag shall be connected to collection bag using hose or other material which shall withstand pressure of ACM waste and water without losing its integrity.

(H) Sliding valve or other device shall separate waste bag from hose to ensure no exposure when waste bag is disconnected.

(I) At least two persons shall perform Class I glove bag removal operations.

(c) Negative pressure glove bag systems. Negative pressure glove bag systems may be used to remove ACM or PACM from piping.

(i) Specifications: In addition to specifications for glove bag systems above, negative pressure glove bag systems shall attach HEPA vacuum systems or other devices to bag during removal.

(ii) Work practices:

(A) The employer shall comply with the work practices for glove bag systems in this section.

(B) The HEPA vacuum cleaner or other device used during removal shall run continually during the operation until it is completed at which time the bag shall be collapsed prior to removal of the bag from the pipe.

(C) Where a separate waste bag is used along with a collection bag and discarded after one use, the collection bag may be reused if rinsed clean with amended water before reuse.

(d) Negative pressure glove box systems: Negative pressure glove boxes may be used to remove ACM or PACM from pipe runs with the following specifications and work practices:

(i) Specifications:

(A) Glove boxes shall be constructed with rigid sides and made from metal or other material which can withstand the weight of the ACM and PACM and water used during removal.

(B) A negative pressure generator shall be used to create negative pressure in the system.

(C) An air filtration unit shall be attached to the box.

(D) The box shall be fitted with gloved apertures.

(E) An aperture at the base of the box shall serve as a bagging outlet for waste ACM and water.

(F) A back-up generator shall be present on site.

(G) Waste bags shall consist of 6 mil thick plastic double-bagged before they are filled or plastic thicker than 6 mil.

(ii) Work practices:

(A) At least two persons shall perform the removal.

(B) The box shall be smoke-tested for leaks and any leaks sealed prior to each use.

(C) Loose or damaged ACM adjacent to the box shall be wrapped and sealed in two layers of 6 mil plastic prior to the job, or otherwise made intact prior to the job.

(D) A HEPA filtration system shall be used to maintain pressure barrier in box.

(e) Water spray process system. A water spray process system may be used for removal of ACM and PACM from cold line piping if, employees carrying out such process have completed a 40-hour separate training course in its use, in addition to training required for employees performing Class I work. The system shall meet the following specifications and shall be performed by employees using the following work practices:

(i) Specifications:

(A) Piping shall be surrounded on 3 sides by rigid framing.

(B) A 360 degree water spray, delivered through nozzles supplied by a high pressure separate water line, shall be formed around the piping.

(C) The spray shall collide to form a fine aerosol which provides a liquid barrier between workers and the ACM and PACM.

(ii) Work practices:

(A) The system shall be run for at least 10 minutes before removal begins.

(B) All removal shall take place within the water barrier.

(C) The system shall be operated by at least three persons, one of whom shall not perform removal, but shall check equipment, and ensure proper operation of the system.

(D) After removal, the ACM and PACM shall be bagged while still inside the water barrier.

(f) A small walk-in enclosure which accommodates no more than two persons (mini-enclosure) may be used if the

disturbance or removal can be completely contained by the enclosure with the following specifications and work practices:

(i) Specifications:

(A) The fabricated or job-made enclosure shall be constructed of 6 mil plastic or equivalent.

(B) The enclosure shall be placed under negative pressure by means of a HEPA filtered vacuum or similar ventilation unit.

(C) Change room. A small change room made of 6-mil-thick polyethylene plastic should be contiguous to the mini-enclosure, and is necessary to allow the worker to vacuum off his/her protective coveralls and remove them before leaving the work area. While inside the enclosure, the worker should wear Tyvek disposable coveralls and use the appropriate HEPA-filtered dual cartridge respiratory protection. The advantages of mini-enclosures are that they limit the spread of asbestos contamination, reduce the potential exposure of bystanders and other workers who may be working in adjacent areas, and are quick and easy to install. The disadvantage of mini-enclosures is that they may be too small to contain the equipment necessary to create a negative-pressure within the enclosure; however, the double layer of plastic sheeting will serve to restrict the release of asbestos fibers to the area outside the enclosure.

(ii) Work practices:

(A) Before use, the mini-enclosure shall be inspected for leaks and smoke-tested to detect breaches, and any breaches sealed.

(B) Before reuse, the interior shall be completely washed with amended water and HEPA-vacuumed.

(C) During use, air movement shall be directed away from the employee's breathing zone within the mini-enclosure.

(8) Alternative control methods for Class I work. Class I work may be performed using a control method which is not referenced in subsection (2)(a) through (3)(e) of this section, or which modifies a control method referenced in subsection (2)(a) through (3)(e) of this section, if the following provisions are complied with:

(a) The control method shall enclose, contain or isolate the processes or source of airborne asbestos dust, or otherwise capture or redirect such dust before it enters the breathing zone of employees.

(b) A certified industrial hygienist or licensed professional engineer who is also qualified as a project designer as defined in WAC 296-62-07703, shall evaluate the work area, the projected work practices and the engineering controls and shall certify in writing that the planned control method is adequate to reduce direct and indirect employee exposure to below the PELs under worst-case conditions of use, and that the planned control method will prevent asbestos contamination outside the regulated area, as measured by clearance sampling which meets the requirements of EPA's Asbestos in Schools rule issued under AHERA, or perimeter monitoring which meets the criteria in subsection (6)(b)(ii) of this section. Where the TSI or surfacing material to be removed is 25 linear or 10 square feet or less, the evaluation required in subsection (8)(b) of this section may be performed by a competent person.

(c) Before work which involves the removal of more than 25 linear or 10 square feet of thermal system insulation or surfacing material is begun using an alternative method which has been the subject of subsection (2)(a) through (3)(e) of this section required evaluation and certification, the employer shall send a copy of such evaluation and certification to the Department of Labor and Industries, Asbestos Certification Program, P.O. Box 44614, Olympia, Washington 98504-4614. The submission shall not constitute approval by WISHA.

(9) Work practices and engineering controls for Class II work.

(a) All Class II work shall be supervised by a competent person as defined in WAC 296-62-07703.

(b) For all indoor Class II jobs, where the employer has not produced a negative exposure assessment pursuant to WAC 296-62-07709(3), or where during the job, changed conditions indicate there may be exposure above the PEL or where the employer does not remove the ACM in a substantially intact state, the employer shall use one of the following methods to ensure that airborne asbestos does not migrate from the regulated area:

(i) Critical barriers shall be placed over all openings to the regulated area; or

(ii) The employer shall use another barrier or isolation method which prevents the migration of airborne asbestos from the regulated area, as verified by perimeter area monitoring or clearance monitoring which meets the criteria set out in subsection (6)(b)(ii) of this section; or

(iii) Impermeable dropcloths shall be placed on surfaces beneath all removal activity.

(c) (Reserved.)

(d) All Class II asbestos work shall be performed using the work practices and requirements set out above in subsection (9)(a) and (b) of this section.

(10) Additional controls for Class II work. Class II asbestos work shall also be performed by complying with the work practices and controls designated for each type of asbestos work to be performed, set out in this paragraph. Where more than one control method may be used for a type of asbestos work, the employer may choose one or a combination of designated control methods. Class II work also may be performed using a method allowed for Class I work, except that glove bags and glove boxes are allowed if they fully enclose the Class II material to be removed.

(a) For removing vinyl and asphalt flooring materials which contain ACM or for which in buildings constructed no later than 1980, the employer has not verified the absence of ACM pursuant to WAC 296-62-07712 (9)(a)(ix). The employer shall ensure that employees comply with the following work practices and that employees are trained in these practices pursuant to WAC 296-62-07722.

(i) Flooring or its backing shall not be sanded.

(ii) Vacuums equipped with HEPA filter, disposable dust bag, and metal floor tool (no brush) shall be used to clean floors.

(iii) Resilient sheeting shall be removed by cutting with wetting of the snip point and wetting during delamination. Rip-up of resilient sheet floor material is prohibited.

(iv) All scraping of residual adhesive and/or backing shall be performed using wet methods.

(v) Dry sweeping is prohibited.

(vi) Mechanical chipping is prohibited unless performed in a negative pressure enclosure which meets the requirements of subsection (7)(a) of this section.

(vii) Tiles shall be removed intact, unless the employer demonstrates that intact removal is not possible.

(viii) When tiles are heated and can be removed intact, wetting may be omitted.

(ix) Resilient flooring material including associated mastic and backing shall be assumed to be asbestos-containing unless an industrial hygienist determines that it is asbestos-free using recognized analytical techniques.

(b) For removing roofing material which contains ACM the employer shall ensure that the following work practices are followed:

(i) Roofing material shall be removed in an intact state to the extent feasible.

(ii) Wet methods shall be used to remove roofing materials that are not intact, or that will be rendered not intact during removal, unless such wet methods are not feasible or will create safety hazards.

(iii) Cutting machines shall be continuously misted during use, unless a competent person determines that misting substantially decreases worker safety.

(iv) When removing built-up roofs with asbestos-containing roofing felts and an aggregate surface using a power roof cutter, all dust resulting from the cutting operation shall be collected by a HEPA dust collector, or shall be HEPA vacuumed by vacuuming along the cut line. When removing built-up roofs with asbestos-containing roofing felts and a smooth surface using a power roof cutter, the dust resulting from the cutting operation shall be collected either by a HEPA dust collector or HEPA vacuuming along the cut line, or by gently sweeping and then carefully and completely wiping up the still wet dust and debris left along the cut line. The dust and debris shall be immediately bagged or placed in covered containers.

(v) Asbestos-containing material that has been removed from a roof shall not be dropped or thrown to the ground. Unless the material is carried or passed to the ground by hand, it shall be lowered to the ground via covered, dust-tight chute, crane or hoist:

(A) Any ACM that is not intact shall be lowered to the ground as soon as is practicable, but in any event no later than the end of the work shift. While the material remains on the roof it shall either be kept wet, placed in an impermeable waste bag, or wrapped in plastic sheeting.

(B) Intact ACM shall be lowered to the ground as soon as is practicable, but in any event no later than the end of the work shift.

(vi) Upon being lowered, unwrapped material shall be transferred to a closed receptacle in such manner so as to preclude the dispersion of dust.

(vii) Roof level heating and ventilation air intake sources shall be isolated or the ventilation system shall be shut down.

(viii) Notwithstanding any other provision of this section, removal or repair of sections of intact roofing less than 25 square feet in area does not require use of wet methods or HEPA vacuuming as long as manual methods which do not render the material nonintact are used to

remove the material and no visible dust is created by the removal method used. In determining whether a job involves less than 25 square feet, the employer shall include all removal and repair work performed on the same roof on the same day.

(c) When removing cementitious asbestos-containing siding and shingles or transite panels containing ACM on building exteriors (other than roofs, where subsection (10)(b) of this section applies) the employer shall ensure that the following work practices are followed:

(i) Cutting, abrading or breaking siding, shingles, or transite panels, shall be prohibited unless the employer can demonstrate that methods less likely to result in asbestos fiber release cannot be used.

(ii) Each panel or shingle shall be sprayed with amended water prior to removal.

(iii) Unwrapped or unbagged panels or shingles shall be immediately lowered to the ground via covered dust-tight chute, crane or hoist, or placed in an impervious waste bag or wrapped in plastic sheeting and lowered to the ground no later than the end of the work shift.

(iv) Nails shall be cut with flat, sharp instruments.

(d) When removing gaskets containing ACM, the employer shall ensure that the following work practices are followed:

(i) If a gasket is visibly deteriorated and unlikely to be removed intact, removal shall be undertaken within a glove bag as described in subsection (7)(b) of this section.

(ii) (Reserved.)

(iii) The gasket shall be immediately placed in a disposal container.

(iv) Any scraping to remove residue must be performed wet.

(e) When performing any other Class II removal of asbestos-containing material for which specific controls have not been listed in subsection (10) of this section, the employer shall ensure that the following work practices are complied with.

(i) The material shall be thoroughly wetted with amended water prior to and during its removal.

(ii) The material shall be removed in an intact state unless the employer demonstrates that intact removal is not possible.

(iii) Cutting, abrading or breaking the material shall be prohibited unless the employer can demonstrate that methods less likely to result in asbestos fiber release are not feasible.

(iv) Asbestos-containing material removed, shall be immediately bagged or wrapped, or kept wet until transferred to a closed receptacle, no later than the end of the work shift.

(f) Alternative work practices and controls. Instead of the work practices and controls listed in subsection (10) of this section, the employer may use different or modified engineering and work practice controls if the following provisions are complied with.

(i) The employer shall demonstrate by data representing employee exposure during the use of such method under conditions which closely resemble the conditions under which the method is to be used, that employee exposure will not exceed the PELs under any anticipated circumstances.

(ii) A competent person shall evaluate the work area, the projected work practices and the engineering controls, and shall certify in writing, that the different or modified controls are adequate to reduce direct and indirect employee exposure to below the PELs under all expected conditions of use and that the method meets the requirements of this standard. The evaluation shall include and be based on data representing employee exposure during the use of such method under conditions which closely resemble the conditions under which the method is to be used for the current job, and by employees whose training and experience are equivalent to employees who are to perform the current job.

(11) Work practices and engineering controls for Class III asbestos work. Class III asbestos work shall be conducted using engineering and work practice controls which minimize the exposure to employees performing the asbestos work and to bystander employees.

(a) The work shall be performed using wet methods.

(b) To the extent feasible, the work shall be performed using local exhaust ventilation.

(c) Where the disturbance involves drilling, cutting, abrading, sanding, chipping, braking, or sawing of thermal system insulation or surfacing material, the employer shall use impermeable dropcloths, and shall isolate the operation using mini-enclosures or glove bag systems pursuant to subsection (7) of this section or another isolation method.

(d) Where the employer does not produce a "negative exposure assessment" for a job, or where monitoring results show the PEL has been exceeded, the employer shall contain the area using impermeable dropcloths and plastic barriers or their equivalent, or shall isolate the operation using a control system listed in and in compliance with subsection (7) of this section.

(e) Employees performing Class III jobs, which involve the disturbance of thermal system insulation or surfacing material, or where the employer does not produce a "negative exposure assessment" or where monitoring results show a PEL has been exceeded, shall wear respirators which are selected, used and fitted pursuant to provisions of WAC 296-62-07715.

(12) Class IV asbestos work. Class IV asbestos jobs shall be conducted by employees trained pursuant to the asbestos awareness training program set out in WAC 296-62-07722. In addition, all Class IV jobs shall be conducted in conformity with the requirements set out in this section, mandating wet methods, HEPA vacuums, and prompt clean up of debris containing ACM and PACM.

(a) Employees cleaning up debris and waste in a regulated area where respirators are required shall wear respirators which are selected, used and fitted pursuant to provisions of WAC 296-62-07715.

(b) Employers of employees who clean up waste and debris in, and employers in control of, areas where friable thermal system insulation or surfacing material is accessible, shall assume that such waste and debris contain asbestos.

(13) Alternative methods of compliance for installation, removal, repair, and maintenance of certain roofing and pipeline coating materials. Notwithstanding any other provision of this section, an employer who complies with all provisions of subsection (10)(a) and (b) of this section when installing, removing, repairing, or maintaining intact pipeline

asphaltic wrap, or roof cements, mastics, coatings, or flashings which contain asbestos fibers encapsulated or coated by bituminous or resinous compounds shall be deemed to be in compliance with this section. If an employer does not comply with all provisions of this subsection (13), or if during the course of the job the material does not remain intact, the provisions of subsection (10) of this section apply instead of this subsection (13).

(a) Before work begins and as needed during the job, a competent person who is capable of identifying asbestos hazards in the workplace and selecting the appropriate control strategy for asbestos exposure, and who has the authority to take prompt corrective measures to eliminate such hazards, shall conduct an inspection of the worksite and determine that the roofing material is intact and will likely remain intact.

(b) All employees performing work covered by this subsection (13) shall be trained in a training program that meets the requirements of WAC 296-62-07722.

(c) The material shall not be sanded, abraded, or ground. Manual methods which do not render the material nonintact shall be used.

(d) Material that has been removed from a roof shall not be dropped or thrown to the ground. Unless the material is carried or passed to the ground by hand, it shall be lowered to the ground via covered, dust-tight chute, crane or hoist. All such material shall be removed from the roof as soon as is practicable, but in any event no later than the end of the work shift.

(e) Where roofing products which have been labeled as containing asbestos pursuant to WAC 296-62-07721, installed on nonresidential roofs during operations covered by this subsection (13), the employer shall notify the building owner of the presence and location of such materials no later than the end of the job.

(f) All removal or disturbance of pipeline asphaltic wrap shall be performed using wet methods.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 97-01-079, § 296-62-07712, filed 12/17/96, effective 3/1/97. Statutory Authority: Chapter 49.17 RCW. 89-21-018 (Order 89-10), § 296-62-07712, filed 10/10/89, effective 11/24/89; 89-11-035 (Order 89-03), § 296-62-07712, filed 5/15/89, effective 6/30/89; 87-24-051 (Order 87-24), § 296-62-07712, filed 11/30/87.]

WAC 296-62-07713 Methods of compliance for asbestos activities in general industry. (1) Engineering controls and work practices.

(a) The employer shall institute engineering controls and work practices to reduce and maintain employee exposure to or below the permissible exposure limits prescribed in WAC 296-62-07705, except to the extent that such controls are not feasible. Engineering controls and work practices include but are not limited to the following:

(i) Local exhaust ventilation equipped with HEPA filter dust collection systems;

(ii) Vacuum cleaners equipped with HEPA filters;

(iii) Enclosure or isolation of processes producing asbestos dust;

(iv) Use of wet methods, wetting agents, or removal encapsulants to control employee exposures during asbestos handling, mixing, removal, cutting, application, and cleanup;

(v) Prompt disposal of wastes contaminated with asbestos in leak-tight containers; or

(vi) Use of work practices or other engineering controls that the director can show to be feasible.

(b) Wherever the feasible engineering controls and work practices that can be instituted are not sufficient to reduce employee exposure to or below the permissible exposure limits prescribed in WAC 296-62-07705, the employer shall use them to reduce employee exposure to the lowest levels achievable by these controls and shall supplement them by the use of respiratory protection that complies with the requirements of WAC 296-62-07715.

(c) For the following operations, wherever feasible engineering controls and work practices that can be instituted are not sufficient to reduce the employee exposure to or below the permissible exposure limits prescribed in WAC 296-62-07705, the employer shall use them to reduce employee exposure to or below 0.5 fiber per cubic centimeter of air (as an eight-hour time-weighted average) or 2.5 fibers per cubic centimeter of air for 30 minutes (short-term exposure), and shall supplement them by the use of any combination of respiratory protection that complies with the requirements of WAC 296-62-07715, work practices and feasible engineering controls that will reduce employee exposure to or below the permissible exposure limits prescribed in WAC 296-62-07705: Coupling cutoff in primary asbestos cement pipe manufacturing; sanding in primary and secondary asbestos cement sheet manufacturing; grinding in primary and secondary friction product manufacturing; carding and spinning in dry textile processes; and grinding and sanding in primary plastics manufacturing.

(d) Local exhaust ventilation. Local exhaust ventilation and dust collection systems shall be designed, constructed, installed, and maintained in accordance with good practices such as those found in the American National Standard Fundamentals Governing the Design and Operation of Local Exhaust Systems, ANSI Z9.2-1979.

(e) Particular tools. All hand-operated and power-operated tools which would produce or release fibers of asbestos so as to expose employees to levels in excess of the exposure limits prescribed in WAC 296-62-07705, such as, but not limited to, saws, scorers, abrasive wheels, and drills, shall be provided with local exhaust ventilation systems which comply with (d) of this subsection. High-speed abrasive disc saws that are not equipped with appropriate engineering controls shall not be used for work related to asbestos.

(f) Wet methods. Asbestos shall be handled, mixed, applied, removed, cut, scored, or otherwise worked in a wet saturated state to prevent the emission of airborne fibers unless the usefulness of the product would be diminished thereby.

(g) Particular products and operations. No asbestos cement, mortar, coating, grout, plaster, or similar material containing asbestos shall be removed from bags, cartons, or other containers in which they are shipped, without being either wetted, enclosed, or ventilated so as to prevent effectively the release of airborne fibers of asbestos.

(h) Compressed air. Compressed air shall not be used to remove asbestos or materials containing asbestos unless the compressed air is used in conjunction with an enclosed

ventilation system designed to effectively capture the dust cloud created by the compressed air.

(2) Clean-up.

(a) After completion of asbestos removal, demolition, and renovation operations, all surfaces in and around the work area shall be cleared of any asbestos debris.

(b) Lock-down. Where asbestos has been removed, encapsulant shall be applied to ensure binding of remaining fibers.

(c) The employer shall demonstrate by monitoring that the airborne fiber concentration is below the permissible exposure limits; or, at or below the airborne fiber level existing prior to the start of the removal, demolition, or renovation project; whichever level is lower.

(3) Compliance program.

(a) Where either the time weighted average and/or excursion limit is exceeded, the employer shall establish and implement a written program to reduce employee exposure to or below the permissible exposure limits by means of engineering and work practice controls as required by subsection (1) of this section, and by the use of respiratory protection where required or permitted under this section.

(b) Such programs shall be reviewed and updated as necessary to reflect significant changes in the status of the employer's compliance program.

(c) Written programs shall be submitted upon request for examination and copying to the director, affected employees and designated employee representatives.

(d) The employer shall not use employee rotation as a means of compliance with the permissible exposure limits specified in WAC 296-62-07705.

(4) Specific compliance methods for brake and clutch repair:

(a) Engineering controls and work practices for brake and clutch repair and service. During automotive brake and clutch inspection, disassembly, repair and assembly operations, the employer shall institute engineering controls and work practices to reduce employee exposure to materials containing asbestos using a negative pressure enclosure/HEPA vacuum system method or low pressure/wet cleaning method which meets the detailed requirements set out in Appendix F to this section. The employer may also comply using an equivalent method which follows written procedures which the employer demonstrates can achieve results equivalent to Method A in Appendix F to this section. For facilities in which no more than 5 pair of brakes or 5 clutches are inspected, disassembled, repaired, or assembled per week, the method set forth in Appendix F to this section may be used.

(b) The employer may also comply by using an equivalent method which follows written procedures, which the employer demonstrates can achieve equivalent exposure reductions as do the two "preferred methods." Such demonstration must include monitoring data conducted under workplace conditions closely resembling the process, type of asbestos containing materials, control method, work practices and environmental conditions which the equivalent method will be used, or objective data, which document that under all reasonably foreseeable conditions of brake and clutch repair applications, the method results in exposure which are

equivalent to the methods set out in Appendix F to this section.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 97-01-079, § 296-62-07713, filed 12/17/96, effective 3/1/97. Statutory Authority: Chapter 49.17 RCW. 90-17-051 (Order 90-10), § 296-62-07713, filed 8/13/90, effective 9/24/90; 89-11-035 (Order 89-03), § 296-62-07713, filed 5/15/89, effective 6/30/89; 87-24-051 (Order 87-24), § 296-62-07713, filed 11/30/87. Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-62-07713, filed 4/27/87.]

WAC 296-62-07715 Respiratory protection. (1)

General. The employer shall provide respirators, and ensure that they are used, where required by WAC 296-62-077 through 296-62-07753. Respirators shall be used in the following circumstances:

(a) During the interval necessary to install or implement feasible engineering and work practice controls;

(b) In work operations, such as maintenance and repair activities, or other activities for which engineering and work practice controls are not feasible;

(c) In work situations where feasible engineering and work practice controls are not yet sufficient to reduce exposure to or below the permissible exposure limits;

(d) In emergencies;

(e) In all regulated areas;

(f) Whenever employee exposure exceeds the permissible exposure limits;

(g) During all Class I asbestos jobs;

(h) During all Class II work where the ACM is not removed in a substantially intact state;

(i) During all Class II and Class III work which is not performed using wet methods, provided, however, that respirators need not be worn during removal of ACM from sloped roofs when a negative exposure assessment has been made and the ACM is removed in an intact state;

(j) During all Class II and Class III asbestos jobs where the employer does not produce a "negative exposure assessment";

(k) During all Class III jobs where TSI or surfacing ACM or PACM is being disturbed; and

(l) During all Class IV work performed within regulated areas where employees performing other work are required to wear respirators.

(2) Respirator selection.

(a) Where respirators are used, the employer shall select and provide, at no cost to the employee, the appropriate respirator as specified in Table 1 of this section or in WAC 296-62-07715(2), and shall ensure that the employee uses the respirator provided.

(b) The employer shall select respirators from among those jointly approved as being acceptable for protection by the Mine Safety and Health Administration (MSHA) and the National Institute for Occupational Safety and Health (NIOSH) under the provisions of 30 CFR Part 11.

(c) The employer shall provide a tight fitting powered, air-purifying respirator in lieu of any negative pressure respirator specified in Table 1 of this section whenever:

(i) An employee chooses to use this type of respirator; and

(ii) This respirator will provide adequate protection to the employee.

(d) In addition to the selection criterion below, the employer shall provide a half-mask air purifying respirator, other than a disposable respirator, equipped with high efficiency filters whenever the employee performs the following activities: Class II and III asbestos jobs where the employer does not produce a negative exposure assessment; and Class III jobs where TSI or surfacing ACM or PACM is being disturbed.

TABLE 1—RESPIRATORY PROTECTION FOR ASBESTOS FIBERS

Airborne concentration of asbestos or conditions of use	Required respirator. (See Note a.)
Not in excess of 1 f/cc (10 X PEL), or otherwise as required independent of exposure	Half-mask air-purifying respirator other than a disposable respirator, equipped with high efficiency filters. (See Note b.)
Not in excess of 5 f/cc (50 X PEL)	Full facepiece air-purifying respirator equipped with high efficiency filters.
Not in excess of 10 f/cc (100 X PEL)	Any powered air-purifying respirator equipped with high efficiency filters or any supplied-air respirator operated in continuous flow mode.
Not in excess of 100 f/cc (1,000 X PEL)	Full facepiece supplied-air respirator operated in pressure demand mode.
Greater than 100 f/cc (1,000 X PEL) or unknown concentration	Full facepiece supplied-air respirator operated in pressure demand mode, equipped with an auxiliary positive pressure self-contained breathing apparatus or HEPA filter egress cartridges. (See Note c.)

Note:

- a. Respirators assigned for higher environmental concentrations may be used at lower concentrations.
- b. A high-efficiency filter means a filter that is capable of trapping and retaining at least 99.97 percent of all monodispersed particles of 0.3 micrometers mean aerodynamic diameter or larger.
- c. See subsection (5)(c) of this section for fit testing requirements.

(3) Special respiratory protection requirements.

(a) Unless specifically identified in this subsection, respirator selection for asbestos removal, demolition, and renovation operations shall be in accordance with Table 1 of subsection (2) of this section. The employer shall provide and require to be worn, at no cost to the employee, a full facepiece supplied-air respirator operated in the pressure demand mode equipped with either an auxiliary positive pressure self-contained breathing apparatus or a HEPA filter

egress cartridge, to employees engaged in the following asbestos operations:

(i) Inside negative pressure enclosures used for removal, demolition, and renovation of friable asbestos from walls, ceilings, vessels, ventilation ducts, elevator shafts, and other structural members, but does not include pipes or piping systems; or

(ii) Any dry removal of asbestos.

(b) For all Class I work excluded or not specified in (a)(i) and (ii) of this subsection, the employer shall provide a tight-fitting powered air purifying respirator equipped with high-efficiency filters or a full facepiece supplied-air respirator operated in the pressure demand mode equipped with HEPA filter egress cartridges or an auxiliary positive pressure self-contained breathing apparatus for all employees within the regulated area where asbestos work is being

performed for which a negative exposure assessment has not been produced and, the exposure assessment indicates the exposure level will not exceed 1 f/cc as an 8-hour time weighted average. A full facepiece supplied-air respirator operated in the pressure demand mode equipped with an auxiliary positive pressure self-contained breathing apparatus, or a HEPA filter egress cartridge, shall be provided under such conditions, if the exposure assessment indicates exposure levels above 1 f/cc as an 8-hour time weighted average.

Exception: In lieu of the supplied-air respirator required by subsection (3) of this section, an employer may provide and require to be worn, at no cost to the employee, a full facepiece supplied-air respirator operated in the continuous flow mode equipped with either an auxiliary positive pressure self-contained breathing apparatus or a back-up HEPA filter egress cartridge where daily and historical personal monitoring data indicates the concentration of asbestos fibers is not reasonably expected to exceed 10 f/cc. The continuous flow respirator shall be operated at a minimum air flow rate of six cubic feet per minute at the facepiece using respirable air supplied in accordance with WAC 296-62-07111.

(4) Respirator program.

(a) Where respiratory protection is used, the employer shall institute a respirator program in accordance with WAC 296-62-071.

(b) The employer shall permit each employee who uses a filter respirator to change the filter elements whenever an increase in breathing resistance is detected and shall maintain an adequate supply of filter elements for this purpose.

(c) Employees who wear respirators shall be permitted to leave work areas to wash their faces and respirator facepieces whenever necessary to prevent skin irritation associated with respirator use.

(d) No employee shall be assigned to tasks requiring the use of respirators if, based upon his or her most recent examination, an examining physician determines that the employee will be unable to function normally wearing a respirator, or that the safety or health of the employee or other employees will be impaired by the use of a respirator. Such employee shall be assigned to another job or given the opportunity to transfer to a different position whose duties he or she is able to perform with the same employer, in the same geographical area and with the same seniority, status, and rate of pay the employee had just prior to such transfer, if such a different position is available.

(5) Respirator fit testing.

(a) The employer shall ensure that the respirator issued to the employee exhibits the least possible facepiece leakage and that the respirator is fitted properly.

(b) For each employee wearing negative pressure respirators, employers shall perform either quantitative or qualitative face fit tests at the time of initial fitting and at least every six months thereafter. The qualitative fit tests may be used only for testing the fit of half-mask respirators where they are permitted to be worn, and shall be conducted in accordance with WAC 296-62-07739, Appendix C. The tests shall be used to select facepieces that provide the required protection as prescribed in Table 1 of this section.

(c) Any supplied-air respirator facepiece equipped with a back-up HEPA filter egress cartridge shall be quantitatively

fit tested with the air supply disconnected at the time of initial fitting and at least every six months thereafter. The quantitative fit tests shall be conducted using the procedures described in WAC 296-62-07739(2), Appendix C, for negative pressure respirators.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 97-01-079, § 296-62-07715, filed 12/17/96, effective 3/1/97. Statutory Authority: Chapter 49.17 RCW. 91-03-044 (Order 90-18), § 296-62-07715, filed 1/10/91, effective 2/12/91; 89-11-035 (Order 89-03), § 296-62-07715, filed 5/15/89, effective 6/30/89; 87-24-051 (Order 87-24), § 296-62-07715, filed 11/30/87. Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-62-07715, filed 4/27/87.]

WAC 296-62-07717 Protective work clothing and equipment. (1) Provision and use. If an employee is exposed to asbestos above the permissible exposure limits, or where the possibility of eye irritation exists, or for which a required negative exposure assessment is not produced and for any employee performing Class I operations, the employer shall provide at no cost to the employee and require that the employee uses appropriate protective work clothing and equipment such as, but not limited to:

(a) Coveralls or similar full-body work clothing;

(b) Gloves, head coverings, and foot coverings; and

(c) Face shields, vented goggles, or other appropriate protective equipment which complies with WAC 296-24-07801.

(2) Removal and storage.

(a) The employer shall ensure that employees remove work clothing contaminated with asbestos only in change rooms provided in accordance with WAC 296-62-07719(1).

(b) The employer shall ensure that no employee takes contaminated work clothing out of the change room, except those employees authorized to do so for the purpose of laundering, maintenance, or disposal.

(c) Contaminated clothing. Contaminated clothing shall be transported in sealed impermeable bags, or other closed, impermeable containers, and be labeled in accordance with WAC 296-62-07721.

(d) Containers of contaminated protective devices or work clothing which are to be taken out of change rooms or the workplace for cleaning, maintenance, or disposal, shall bear labels in accordance with WAC 296-62-07721(3).

(3) Cleaning and replacement.

(a) The employer shall clean, launder, repair, or replace protective clothing and equipment required by this paragraph to maintain their effectiveness. The employer shall provide clean protective clothing and equipment at least weekly to each affected employee.

(b) The employer shall prohibit the removal of asbestos from protective clothing and equipment by blowing or shaking.

(c) Laundering of contaminated clothing shall be done so as to prevent the release of airborne fibers of asbestos in excess of the permissible exposure limits prescribed in WAC 296-62-07705.

(d) Any employer who gives contaminated clothing to another person for laundering shall inform such person of the requirement in (c) of this subsection to effectively prevent the release of airborne fibers of asbestos in excess of the permissible exposure limits.

(e) The employer shall inform any person who launders or cleans protective clothing or equipment contaminated with asbestos of the potentially harmful effects of exposure to asbestos.

(f) Contaminated clothing shall be transported in sealed impermeable bags, or other closed, impermeable containers, and labeled in accordance with WAC 296-62-07721.

(4) Inspection of protective clothing for construction and shipyard work.

(a) The competent person shall examine worksuits worn by employees at least once per workshift for rips or tears that may occur during performance of work.

(b) When rips or tears are detected while an employee is working, rips and tears shall be immediately mended, or the worksuit shall be immediately replaced.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 97-01-079, § 296-62-07717, filed 12/17/96, effective 3/1/97. Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-62-07717, filed 7/20/94, effective 9/20/94; 89-11-035 (Order 89-03), § 296-62-07717, filed 5/15/89, effective 6/30/89; 87-24-051 (Order 87-24), § 296-62-07717, filed 11/30/87. Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-62-07717, filed 4/27/87.]

WAC 296-62-07719 Hygiene facilities and practices.

(1) Change rooms.

(a) The employer shall provide clean change rooms for employees required to work in regulated areas or required by WAC 296-62-07717(1) to wear protective clothing.

Exception: In lieu of the change area requirement specified in this subsection, the employer may permit employees in Class III and Class IV asbestos work, to clean their protective clothing with a portable HEPA-equipped vacuum before such employees leave the area where maintenance was performed.

(b) The employer shall ensure that change rooms are in accordance with WAC 296-24-120, and are equipped with two separate lockers or storage facilities, so separated as to prevent contamination of the employee's street clothes from his/her protective work clothing and equipment.

(2) Showers.

(a) The employer shall ensure that employees who work in negative pressure enclosures required by WAC 296-62-07712, or who work in areas where their airborne exposure is above the permissible exposure limits prescribed in WAC 296-62-07705, shower at the end of the work shift.

(b) The employer shall provide shower facilities which comply with WAC 296-24-12009(3).

(c) The employer shall ensure that employees who are required to shower pursuant to (a) of this subsection do not leave the workplace wearing any clothing or equipment worn during the work shift.

(3) Special requirements in addition to the other provisions of WAC 296-62-07719 for construction work defined in WAC 296-155-012 and for all shipyard work defined in WAC 296-304-010.

(a) Requirements for employees performing Class I asbestos jobs involving over 25 linear or 10 square feet of TSI or surfacing ACM and PACM.

(i) Decontamination areas: The employer shall establish a decontamination area that is adjacent and connected to the regulated area for the decontamination of such employees. The decontamination area shall consist of an equipment

room, shower area, and clean room in series. The employer shall ensure that employees enter and exit the regulated area through the decontamination area.

(A) Equipment room. The equipment room shall be supplied with impermeable, labeled bags and containers for the containment and disposal of contaminated protective equipment.

(B) Shower area. Shower facilities shall be provided which comply with WAC 296-24-12009(3), unless the employer can demonstrate that they are not feasible. The showers shall be adjacent both to the equipment room and the clean room, unless the employer can demonstrate that this location is not feasible. Where the employer can demonstrate that it is not feasible to locate the shower between the equipment room and the clean room, or where the work is performed outdoors, the employers shall ensure that employees:

(I) Remove asbestos contamination from their worksuits in the equipment room using a HEPA vacuum before proceeding to a shower that is not adjacent to the work area; or

(II) Remove their contaminated worksuits in the equipment room, then don clean worksuits, and proceed to a shower that is not adjacent to the work area.

(C) Clean change room. The clean room shall be equipped with a locker or appropriate storage container for each employee's use.

(ii) Decontamination area entry procedures. The employer shall ensure that employees:

(A) Enter the decontamination area through the clean room;

(B) Remove and deposit street clothing within a locker provided for their use; and

(C) Put on protective clothing and respiratory protection before leaving the clean room.

(D) Before entering the regulated area, the employer shall ensure that employees pass through the equipment room.

(iii) Decontamination area exit procedures. The employer shall ensure that:

(A) Before leaving the regulated area, employees shall remove all gross contamination and debris from their protective clothing;

(B) Employees shall remove their protective clothing in the equipment room and deposit the clothing in labeled impermeable bags or containers;

(C) Employees shall not remove their respirators in the equipment room;

(D) Employees shall shower prior to entering the clean room. When taking a shower, employees shall be fully wetted, including the face and hair, prior to removing the respirators;

(E) After showering, employees shall enter the clean room before changing into street clothes.

(b) Requirements for Class I work involving less than 25 linear or 10 square feet of TSI or surfacing ACM and PACM, and for Class II and Class III asbestos work operations where exposures exceed a PEL or where there is no negative exposure assessment produced before the operation.

(i) The employer shall establish an equipment room or area that is adjacent to the regulated area for the decontami-

nation of employees and their equipment which is contaminated with asbestos which shall consist of an area covered by a impermeable drop cloth on the floor or horizontal working surface.

(ii) The area must be of sufficient size as to accommodate cleaning of equipment and removing personal protective equipment without spreading contamination beyond the area (as determined by visible accumulations).

(iii) Work clothing must be cleaned with a HEPA vacuum before it is removed.

(iv) All equipment and surfaces of containers filled with ACM must be cleaned prior to removing them from the equipment room or area.

(v) The employer shall ensure that employees enter and exit the regulated area through the equipment room or area.

(c) Requirements for Class IV work. Employers shall ensure that employees performing Class IV work within a regulated area comply with hygiene practice required of employees performing work which has a higher classification within that regulated area. Otherwise employers of employees cleaning up debris and material which is TSI or surfacing ACM or identified as PACM shall provide decontamination facilities for such employees which are required by WAC 296-62-07719 (3)(b).

(d) Decontamination area for personnel shall not be used for the transportation of asbestos debris.

(e) Waste load-out procedure. The waste load-out area as required by WAC 296-62-07723 shall be used as an area for final preparation and external decontamination of waste containers, as a short term storage area for bagged waste, and as a port for transporting waste. The employer shall ensure waste containers be free of all gross contaminated material before removal from the negative-pressure enclosure. Gross contamination shall be wiped, scraped off, or washed off containers before they are placed into a two chamber air lock which is adjacent to the negative-pressure enclosure. In the first chamber, the exterior of the waste container shall be decontaminated or placed within a second waste container, and then it shall be moved into the second chamber of the air lock for temporary storage or transferred outside of the regulated area. The second waste container shall not be reused unless thoroughly decontaminated.

(4) Lunchrooms.

(a) The employer shall provide lunchroom facilities for employees who work in areas where their airborne exposure is above the time weighted average and/or excursion limit.

(b) The employer shall ensure that lunchroom facilities have a positive pressure, filtered air supply, and are readily accessible to employees.

(c) The employer shall ensure that employees who work in areas where their airborne exposure is above the time weighted average and/or excursion limit, wash their hands and faces prior to eating, drinking, or smoking.

(d) The employer shall ensure that employees do not enter lunchroom facilities with protective work clothing or equipment unless surface asbestos fibers have been removed from the clothing or equipment by vacuuming or other method that removes dust without causing the asbestos to become airborne.

(5) Smoking in work areas. The employer shall ensure that employees do not smoke in work areas where they are

occupationally exposed to asbestos because of activities in that work area.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 97-01-079, § 296-62-07719, filed 12/17/96, effective 3/1/97. Statutory Authority: Chapter 49.17 RCW. 91-03-044 (Order 90-18), § 296-62-07719, filed 1/10/91, effective 2/12/91; 89-11-035 (Order 89-03), § 296-62-07719, filed 5/15/89, effective 6/30/89; 87-24-051 (Order 87-24), § 296-62-07719, filed 11/30/87. Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-62-07719, filed 4/27/87.]

WAC 296-62-07721 Communication of hazards to employees. (1) Communication of hazards to employees. General industry requirements.

(a) Introduction. This section applies to the communication of information concerning asbestos hazards in general industry. Asbestos exposure in industry occurs in a wide variety of industrial and commercial settings. Employees who manufacture asbestos-containing products may be exposed to asbestos fibers. Employees who repair and replace automotive brakes and clutches may be exposed to asbestos fibers. In addition, employees engaged in housekeeping activities in industrial facilities with asbestos product manufacturing operations, and in public and commercial buildings with installed asbestos-containing materials may be exposed to asbestos fibers. It should be noted that employees who perform housekeeping activities during and after construction activities are covered by asbestos construction work requirements in WAC 296-62-077. Housekeeping employees, regardless of industry designation, should know whether building components they maintain may expose them to asbestos. Building owners are often the only and/or best source of information concerning the presence of previously installed asbestos-containing building materials. Therefore they, along with employers of potentially exposed employees, are assigned specific information conveying and retention duties under this section.

(b) Installed asbestos-containing material. Employers and building owners are required to treat installed TSI and sprayed-on and troweled-on surfacing materials as ACM for the purposes of this standard. These materials are designated "presumed ACM or PACM," and are defined in WAC 296-62-07703. Asphalt and vinyl flooring installed no later than 1980 also shall be treated as asbestos-containing. The employer or building owner may demonstrate that PACM and flooring materials do not contain asbestos by complying with WAC 296-62-07721(3).

(c) Duties of employers and building and facility owners.

(i) Building and facility owners shall determine the presence, location, and quantity of ACM and/or PACM at the worksite. Employers and building and facility owners shall exercise due diligence in complying with these requirements to inform employers and employees about the presence and location of ACM and PACM.

(ii) Before authorizing or allowing any construction, renovation, remodeling, maintenance, repair, or demolition project, an owner or owner's agent shall perform, or cause to be performed, a good faith inspection to determine whether materials to be worked on or removed contain asbestos. The inspection shall be documented by a written

report maintained on file and made available upon request to the director.

(A) The good faith inspection shall be conducted by an accredited inspector.

(B) Such good faith inspection is not required if the owner or owner's agent is reasonably certain that asbestos will not be disturbed by the project or the owner or owner's agent assumes that the suspect material contains asbestos and handles the material in accordance with WAC 296-62-07701 through 296-62-07753.

(iii) The owner or owner's agent shall provide, to all contractors submitting a bid to undertake any construction, renovation, remodeling, maintenance, repair, or demolition project, the written statement either of the reasonable certainty of nondisturbance of asbestos or of assumption of the presence of asbestos. Contractors shall be provided with the written report before they apply or bid to work.

(iv) Any owner or owner's agent who fails to comply with (c)(ii) and (iii) of this subsection shall be subject to a mandatory fine of not less than two hundred fifty dollars for each violation. Each day the violation continues shall be considered a separate violation. In addition, any construction, renovation, remodeling, maintenance, repair, or demolition which was started without meeting the requirements of this section shall be halted immediately and cannot be resumed before meeting such requirements.

(v) Building and facility owners shall inform employers of employees, and employers shall inform employees who will perform housekeeping activities in areas which contain ACM and/or PACM of the presence and location of ACM and/or PACM in such areas which may be contacted during such activities.

(vi) Upon written or oral request, building or facility owners shall make a copy of the written report required in this section available to the department of labor and industries and the collective bargaining representatives or employee representatives of any employee who may be exposed to any asbestos or asbestos-containing materials. A copy of the written report shall be posted conspicuously at the location where employees report to work.

(vii) Building and facility owners shall maintain records of all information required to be provided pursuant to this section and/or otherwise known to the building owner concerning the presence, location and quantity of ACM and PACM in the building/facility. Such records shall be kept for the duration of ownership and shall be transferred to successive owners.

(2) Communication of hazards to employees. Requirements for construction and shipyard employment activities.

(a) Introduction. This section applies to the communication of information concerning asbestos hazards in construction and shipyard employment activities. Most asbestos-related construction and shipyard activities involve previously installed building materials. Building/vessel owners often are the only and/or best sources of information concerning them. Therefore, they, along with employers of potentially exposed employees, are assigned specific information conveying and retention duties under this section. Installed Asbestos Containing Building/Vessel Material: Employers and building/vessel owners shall identify TSI and sprayed or troweled on surfacing materials as asbestos-containing unless

the employer, by complying with WAC 296-62-07721(3) determines it is not asbestos containing. Asphalt or vinyl flooring/decking material installed in buildings or vessels no later than 1980 shall also be considered as asbestos containing unless the employer/owner, pursuant to WAC 296-62-07721(3) determines it is not asbestos containing. If the employer or building/vessel owner has actual knowledge or should have known, through the exercise of due diligence, that materials other than TSI and sprayed-on or troweled-on surfacing materials are asbestos containing, they shall be treated as such. When communicating information to employees pursuant to this standard, owners and employers shall identify "PACM" as ACM. Additional requirements relating to communication of asbestos work on multi-employer worksites are set out in WAC 296-62-07706.

(b) Duties of building/vessel and facility owners.

(i) Before work subject to this section is begun, building/vessel and facility owners shall identify the presence, location and quantity of ACM, and/or PACM at the work site. All thermal system insulation and sprayed on or troweled on surfacing materials in buildings/vessels or substrates constructed no later than 1980 shall be identified as PACM. In addition, resilient flooring/decking material installed no later than 1980 shall also be identified as asbestos containing.

(ii) Before authorizing or allowing any construction, renovation, remodeling, maintenance, repair, or demolition project, a building/vessel and facility owner or owner's agent shall perform, or cause to be performed, a good faith inspection to determine whether materials to be worked on or removed contain asbestos. The inspection shall be documented by a written report maintained on file and made available upon request to the director.

(A) The good faith inspection shall be conducted by an accredited inspector.

(B) Such good faith inspection is not required if the building/vessel and facility owner or owner's agent assumes that the suspect material contains asbestos and handles the material in accordance with WAC 296-62-07701 through 296-62-07753.

(iii) The building/vessel and facility owner or owner's agent shall provide, to all contractors submitting a bid to undertake any construction, renovation, remodeling, maintenance, repair, or demolition project, the written statement either of the reasonable certainty of nondisturbance of asbestos or of assumption of the presence of asbestos. Contractors shall be provided the written report before they apply or bid on work.

(iv) Any building/vessel and facility owner or owners agent who fails to comply with WAC 296-62-07719 (2)(b)(ii) and (iii) shall be subject to a mandatory fine of not less than two hundred fifty dollars for each violation. Each day the violation continues shall be considered a separate violation. In addition, any construction, renovation, remodeling, maintenance, repair, or demolition which was started without meeting the requirements of this section shall be halted immediately and cannot be resumed before meeting such requirements.

(v) Upon written or oral request, building/vessel and facility owner or owner's agent shall make a copy of the written report required in this section available to the

department of labor and industries and the collective bargaining representatives or employee representatives of any employee who may be exposed to any asbestos or asbestos-containing materials. A copy of the written report shall be posted conspicuously at the location where employees report to work.

(vi) Building/vessel and facility owner or owner's agent shall notify in writing the following persons of the presence, location and quantity of ACM or PACM, at work sites in their buildings/facilities/vessels.

(A) Prospective employers applying or bidding for work whose employees reasonably can be expected to work in or adjacent to areas containing such material;

(B) Employees of the owner who will work in or adjacent to areas containing such material;

(C) On multi-employer worksites, all employers of employees who will be performing work within or adjacent to areas containing such materials;

(D) Tenants who will occupy areas containing such materials.

(c) Duties of employers whose employees perform work subject to this standard in or adjacent to areas containing ACM and PACM. Building/vessel and facility owner or owner's agents whose employees perform such work shall comply with these provisions to the extent applicable.

(i) Before work subject to this standard is begun, building/vessel and facility owner or owner's agents shall determine the presence, location, and quantity of ACM and/or PACM at the work site pursuant to WAC 296-62-07721 (2)(b).

(ii) Before work under this standard is performed employers of employees who will perform such work shall inform the following persons of the location and quantity of ACM and/or PACM present at the work site and the precautions to be taken to insure that airborne asbestos is confined to the area.

(A) Owners of the building/vessel or facility;

(B) Employees who will perform such work and employers of employees who work and/or will be working in adjacent areas;

(iii) Upon written or oral request, a copy of the written report required in this section shall be made available to the department of labor and industries and the collective bargaining representatives or employee representatives of any employee who may be exposed to any asbestos or asbestos-containing materials. A copy of the written report shall be posted conspicuously at the location where employees report to work.

(iv) Within 10 days of the completion of such work, the employer whose employees have performed work subject to this standard, shall inform the building/vessel or facility owner and employers of employees who will be working in the area of the current location and quantity of PACM and/or ACM remaining in the former regulated area and final monitoring results, if any.

(d) In addition to the above requirements, all employers who discover ACM and/or PACM on a work site shall convey information concerning the presence, location and quantity of such newly discovered ACM and/or PACM to the owner and to other employers of employees working at the work site, within 24 hours of the discovery.

(e) No contractor may commence any construction, renovation, remodeling, maintenance, repair, or demolition project without receiving a copy of the written response or statement required by WAC 296-62-07721 (2)(b). Any contractor who begins any project without the copy of the written report or statement shall be subject to a mandatory fine of not less than two hundred fifty dollars per day. Each day the violation continues shall be considered a separate violation.

(3) Criteria to rebut the designation of installed material as PACM.

(a) At any time, an employer and/or building/vessel owner may demonstrate, for purposes of this standard, that PACM does not contain asbestos. Building/vessel owners and/or employers are not required to communicate information about the presence of building material for which such a demonstration pursuant to the requirements of (b) of this subsection has been made. However, in all such cases, the information, data and analysis supporting the determination that PACM does not contain asbestos, shall be retained pursuant to WAC 296-62-07727.

(b) An employer or owner may demonstrate that PACM does not contain asbestos by the following:

(i) Having a completed inspection conducted pursuant to the requirements of AHERA (40 CFR Part 763, Subpart E) which demonstrates that the material is not ACM;

(ii) Performing tests of the material containing PACM which demonstrate that no asbestos is present in the material. Such tests shall include analysis of 3 bulk samples of each homogeneous area of PACM collected in a randomly distributed manner. The tests, evaluation and sample collection shall be conducted by an accredited inspector. Analysis of samples shall be performed by persons or laboratories with proficiency demonstrated by current successful participation in a nationally recognized testing program such as the National Voluntary Laboratory Accreditation Program (NVLAP) of the National Institute for Standards and Technology (NIST) of the Round Robin for bulk samples administered by the American Industrial Hygiene Associate (AIHA), or an equivalent nationally recognized Round Robin testing program.

(4) At the entrance to mechanical rooms/areas in which employees reasonably can be expected to enter and which contain TSI or surfacing ACM and PACM, the building/vessel and facility owner or owner's agent shall post signs which identify the material which is present, its location, and appropriate work practices which, if followed, will ensure that ACM and/or PACM will not be disturbed.

(5) Warning signs.

(a) Warning signs that demarcate the regulated area shall be provided and displayed at each location where a regulated area is required. In addition, warning signs shall be posted at all approaches to regulated areas and be posted at such a distance from such a location that an employee may read the signs and take necessary protective steps before entering the area marked by the signs.

(b) The warning signs required by (a) of this subsection shall bear the following information:

DANGER
ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY

RESPIRATORS AND PROTECTIVE CLOTHING ARE REQUIRED
IN THIS AREA

(c) The employer shall ensure that employees working in and contiguous to regulated areas comprehend the warning signs required to be posted by (a) of this subsection. Means to ensure employee comprehension may include the use of foreign languages, pictographs, and graphics.

(6) Warning labels.

(a) Warning labels shall be affixed to all products containing asbestos including raw materials, mixtures, scrap, waste, debris, and other products containing asbestos fibers, and to their containers including waste containers. Where feasible, installed asbestos products shall contain a visible label.

(b) Labels shall be printed in large, bold letters on a contrasting background.

(c) The labels shall comply with the requirements of WAC 296-62-05411, and shall include the following information:

DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD
AVOID BREATHING AIRBORNE ASBESTOS FIBERS

(7) The provisions for labels required by subsection (6)(a) of this section or for material safety data sheets required by subsection (8) of this section do not apply where:

(a) Asbestos fibers have been modified by a bonding agent, coating, binder, or other material, provided that the manufacturer can demonstrate that during any reasonably foreseeable use, handling, storage, disposal, processing, or transportation, no airborne concentrations of fibers of asbestos in excess of the excursion limit will be released; or

(b) Asbestos is present in a product in concentrations less than 0.1 percent by weight.

(8) Material safety data sheets. Employers who are manufacturers or importers of asbestos, or asbestos products shall comply with the requirements regarding development of material safety data sheets as specified in WAC 296-62-05413, except as provided by subsection (7) of this section.

(9) When a building/vessel owner/or employer identifies previously installed PACM and/or ACM, labels or signs shall be affixed or posted so that employees will be notified of what materials contain PACM and/or ACM. The employer shall attach such labels in areas where they will clearly be noticed by employees who are likely to be exposed, such as at the entrance to mechanical rooms/areas. Signs required by subsection (5)(a) of this section may be posted in lieu of labels so long as they contain information required for labeling.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 97-01-079, § 296-62-07721, filed 12/17/96, effective 3/1/97. Statutory Authority: Chapter 49.17 RCW. 93-01-005 (Order 92-20), § 296-62-07721, filed 12/2/92, effective 1/15/93; 91-03-044 (Order 90-18), § 296-62-07721, filed 1/10/91, effective 2/12/91; 89-21-018 (Order 89-10), § 296-62-07721, filed

10/10/89, effective 11/24/89; 89-11-035 (Order 89-03), § 296-62-07721, filed 5/15/89, effective 6/30/89; 87-24-051 (Order 87-24), § 296-62-07721, filed 11/30/87. Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-62-07721, filed 4/27/87.]

WAC 296-62-07722 Employee information and training. (1) Certification.

(a) All individuals working or supervising asbestos projects, as defined in WAC 296-65-003 shall be certified as required by WAC 296-65-010, 296-65-012, and 296-65-030.

(b) In cases where certification requirements of chapter 296-65 WAC do not apply, all employees shall be trained according to provisions of this section regardless of their exposure levels.

(2) Training shall be provided prior to or at the time of initial assignment, unless the employee has received equivalent training within the previous twelve months, and at least annually thereafter.

(3) Training for employees performing Class I and Class II operations.

(a) Training for Class I and Class II operations shall be the certified asbestos worker training specified in WAC 296-65-003, 296-65-010, and 296-65-030.

(b) Exceptions. For employees whose Class II work with intact asbestos-containing materials involves only the removal and/or disturbance of one generic category of intact building/vessel material, such as intact roofing material, bituminous or asphaltic pipeline coating, intact flooring/decking material, siding materials and ceiling tiles, or transite panels, such employers are required to train employees who perform such work by providing a training course which includes as a minimum all elements of subsection (5) of this section and in addition the specific work practices and engineering controls set forth in WAC 296-62-07712 and 296-62-07713 which specifically relate to that material category. Such course shall include "hands-on" training, and shall take at least 8 hours.

(i) For Class II operations involving intact materials not specified in (b) of this subsection, training shall include the requirements of (b) of this subsection and specific work practices and engineering controls specified in WAC 296-62-07712 which specifically relates to the category of material being removed, and shall include hands-on training in the work practices applicable to each category of material the employee removes and each removal method that the employee uses.

(ii) Employees performing Class II operations that require the use of critical barriers (or equivalent isolation methods) and/or negative pressure enclosures, shall be certified as required by WAC 296-65-010, 296-65-012, and 296-65-030.

(4) Training for Class III and IV operations.

(a) Training for employees performing Class III and IV operations shall be the certified asbestos worker training specified in WAC 296-65-003, 296-65-001, and 296-65-030.

(b) Training for Class III asbestos work exempted from certification requirements in chapter 296-65 WAC, safety standards for asbestos removal and encapsulation shall be the equivalent in curriculum and training method to the 16-hour operations and maintenance course developed by EPA for maintenance and custodial workers who conduct activities

that will result in the disturbance of ACM. (See 40 CFR 763.92(a)(2).) Such course shall include "hands-on" training in the use of respiratory protection and work practices and shall take at least 16 hours.

(c) Training for Class IV asbestos work exempted from certification requirements in chapter 296-65 WAC, safety standards for asbestos removal and encapsulation shall be the equivalent in curriculum and training method to the awareness training course developed by EPA for maintenance and custodial workers who work in buildings containing asbestos-containing material. (See 40 CFR 763.92(a)(1).) Such course shall include available information concerning the locations of PACM an ACM, and asbestos-containing flooring material, or flooring material where the absence of asbestos has not been certified; and instruction in recognition of damage, deterioration, and delamination of asbestos-containing building materials. Such a course shall take at least 2 hours.

(5) The training program shall be conducted in a manner which the employee is able to understand. The employer shall ensure that each employee is informed of the following:

(a) The health effects associated with asbestos exposure;

(b) The relationship between smoking and exposure to asbestos producing lung cancer;

(c) Methods of recognizing asbestos and quantity, location, manner of use, release (including the requirements of WAC 296-62-07721 (1)(c) and (2)(b) to presume certain building materials contain asbestos), and storage of asbestos and the specific nature of operations which could result in exposure to asbestos;

(d) The engineering controls and work practices associated with the employee's job assignment;

(e) The specific procedures implemented to protect employees from exposure to asbestos, such as appropriate work practices, housekeeping procedures, hygiene facilities, decontamination procedures, emergency and clean-up procedures (including where Class III and IV work is performed, the contents "Managing Asbestos In Place" (EPA 20T-2003, July 1990) or its equivalent in content), personal protective equipment to be used, waste disposal procedures, and any necessary instructions in the use of these controls and procedures;

(f) The purpose, proper use, and limitations of respirators and protective clothing;

(g) The purpose and a description of the medical surveillance program required by WAC 296-62-07725;

(h) The content of this standard, including appendices;

(i) The names, addresses and phone numbers of public health organizations which provide information, materials, and/or conduct programs concerning smoking cessation. The employer may distribute the list of such organizations contained in Appendix I, to comply with this requirement; and

(j) The requirements for posting signs and affixing labels and the meaning of the required legends for such signs and labels.

(6) The employer shall also provide, at no cost to employees who perform housekeeping operations in a facility which contains ACM or PACM, an asbestos awareness training course, which shall at a minimum contain the following elements: Health effects of asbestos, locations of

ACM and PACM in the building/facility, recognition of ACM and PACM damage and deterioration, requirements in this standard relating to housekeeping, and proper response to fiber release episodes, to all employees who are or will work in areas where ACM and/or PACM is present. Each such employee shall be so trained at least once a year.

(7) Access to information and training materials.

(a) The employer shall make a copy of this standard and its appendices readily available without cost to all affected employees.

(b) The employer shall provide, upon request, all materials relating to the employee information and training program to the director.

(c) The employer shall inform all employees concerning the availability of self-help smoking cessation program material. Upon employee request, the employer shall distribute such material, consisting of NIH Publication No. 89-1647, or equivalent self-help material, which is approved or published by a public health organization listed in Appendix I, WAC 296-62-07751.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 97-01-079, § 296-62-07722, filed 12/17/96, effective 3/1/97.]

WAC 296-62-07723 Housekeeping. (1) All surfaces shall be maintained as free as practicable of accumulations of dusts and waste containing asbestos.

(2) All spills and sudden releases of material containing asbestos shall be cleaned up as soon as possible.

(3) Surfaces contaminated with asbestos may not be cleaned by the use of compressed air.

(4) Vacuuming. HEPA-filtered vacuuming equipment shall be used for vacuuming. The equipment shall be used and emptied in a manner which minimizes the reentry of asbestos into the workplace.

(5) Shoveling, dry sweeping, and dry clean-up of asbestos may be used only where vacuuming and/or wet cleaning are not feasible.

(6) Waste disposal. Waste, scrap, debris, bags, containers, equipment, and clothing contaminated with asbestos consigned for disposal, shall be collected and disposed of in sealed impermeable bags, or other closed, impermeable containers. To avoid breakage, bags shall be at least six mils in thickness and shall not be dragged or slid across rough or abrasive surfaces.

(7) Waste removal. Whenever a negative-pressure enclosure is required by WAC 296-62-07712, the employer wherever feasible, shall establish a waste-load-out area that is adjacent and connected to the negative-pressure enclosure, constructed of a two chamber air lock, for the decontamination and removal of asbestos debris.

(8) Deterioration. Asbestos and asbestos containing material which has become damaged or deteriorated shall be repaired, enclosed, encapsulated, or removed.

(9) Care of asbestos-containing flooring/decking material.

(a) Sanding of asbestos-containing floor/deck material is prohibited.

(b) Stripping of finishes shall be conducted using low abrasion pads at speeds lower than 300 rpm and wet methods.

(c) Burnishing or dry buffing may be performed only on asbestos-containing flooring/decking which has sufficient finish so that the pad cannot contact the asbestos-containing material.

(d) Dust and debris in an area containing TSI or surfacing ACM/PACM or visibly deteriorated ACM, shall not be dusted or swept dry, or vacuumed without using a HEPA filter.

(10) Waste and debris and accompanying dust in an area containing accessible thermal system insulation or surfacing material or visibly deteriorated ACM:

(a) Shall not be dusted or swept dry, or vacuumed without using a HEPA filter;

(b) Shall be promptly cleaned up and disposed of in leak tight containers.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 97-01-079, § 296-62-07723, filed 12/17/96, effective 3/1/97. Statutory Authority: Chapter 49.17 RCW. 87-24-051 (Order 87-24), § 296-62-07723, filed 11/30/87. Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-62-07723, filed 4/27/87.]

WAC 296-62-07725 Medical surveillance. (1) General.

(a) Employees covered. The employer shall institute a medical surveillance program for all employees who are or will be exposed to airborne concentrations of fibers of asbestos at or above the permissible exposure limits. Exception.

Employers in the construction or shipyard industries shall institute a medical surveillance program for all employees who for a combined total of 30 or more days per year are engaged in Class I, II, and III work, or are exposed at or above the permissible exposure limit for combined 30 days or more per year; or who are required by the section to wear negative pressure respirators. For the purpose of this subsection, any day in which an employee engaged in Class II or III work or a combination thereof for one hour or less, and, while doing so adheres to the work practices specified in this standard, shall not count.

(b) Examination by a physician.

(i) The employer shall ensure that all medical examinations and procedures are performed by or under the supervision of a licensed physician, and shall be provided without cost to the employee and at a reasonable time and place.

(ii) Persons other than licensed physicians, who administer the pulmonary function testing required by this section, shall complete a training course in spirometry sponsored by an appropriate academic or professional institution.

(2) Preplacement examinations.

(a) Except as provided by WAC 296-62-07725 (1)(a), before an employee is assigned to an occupation exposed to airborne concentrations of asbestos, a preplacement medical examination shall be provided or made available by the employer. Examinations administered using the thirty or more days per year criteria of WAC 296-62-07725 (1)(a) shall be given within ten working days following the thirtieth day of exposure. Examinations must be given prior to assignment of employees to areas where negative-pressure respirators are worn.

(b) All examinations shall include, as a minimum, a medical and work history: A complete physical examination

of all systems with special emphasis on the pulmonary, cardiovascular, and gastrointestinal systems; completion of the respiratory disease standardized questionnaire in WAC 296-62-07741, Appendix D, Part 1; a chest roentgenogram (posterior-anterior 14x17 inches); pulmonary function tests to include forced vital capacity (FVC) and forced expiratory volume at 1 second (FEV_{1.0}); and any additional tests deemed appropriate by the examining physician. Interpretation and classification of chest roentgenograms shall be conducted in accordance with WAC 296-62-07743, Appendix E.

(3) Periodic examinations.

(a) Periodic medical examinations shall be made available annually.

(b) The scope of the medical examination shall be in conformance with the protocol established in subsection (2)(b) of this section, except that the frequency of chest roentgenograms shall be conducted in accordance with Table 2 of this section, and the abbreviated standardized questionnaire contained in WAC 296-62-07741, Appendix D, Part 2, shall be administered to the employee.

TABLE 2—FREQUENCY OF CHEST ROENTGENOGRAMS

Years since first exposure	Age of employee		
	15 to 35	35+ to 45	45+
0 to 10	Every 5 years	Every 5 years	Every 5 years.
10+	Every 5 years	Every 2 years	Every 1 year.

(c) If the examining physician determines that any of the examinations should be provided more frequently than specified, the employer shall provide such examinations to affected employees at the frequencies specified by the physician.

(4) Termination of employment examinations.

(a) The employer shall provide, or make available, a termination of employment medical examination for any employee who has been exposed to airborne concentrations of fibers of asbestos at or above the permissible exposure limits.

(b) The medical examination shall be in accordance with the requirements of the periodic examinations stipulated in subsection (3) of this section, and shall be given within thirty calendar days before or after the date of termination of employment.

(5) Recent examinations. No medical examination is required of any employee, if adequate records show that the employee has been examined in accordance with subsection (2), (3), or (4) of this section within the past one-year period.

(6) Information provided to the physician. The employer shall provide the following information to the examining physician:

(a) A copy of this standard and Appendices D, E, and H of WAC 296-62-07741, 296-62-07743, and 296-62-07749 respectively.

(b) A description of the affected employee's duties as they relate to the employee's exposure.

(c) The employee's representative exposure level or anticipated exposure level.

(d) A description of any personal protective and respiratory equipment used or to be used.

(e) Information from previous medical examinations of the affected employee that is not otherwise available to the examining physician.

(7) Physician's written opinion.

(a) The employer shall obtain a written signed opinion from the examining physician. This written opinion shall contain the results of the medical examination and shall include:

(i) The physician's opinion as to whether the employee has any detected medical conditions that would place the employee at an increased risk of material health impairment from exposure to asbestos;

(ii) Any recommended limitations on the employee or upon the use of personal protective equipment such as clothing or respirators;

(iii) A statement that the employee has been informed by the physician of the results of the medical examination and of any medical conditions resulting from asbestos exposure that require further explanation or treatment; and

(iv) A statement that the employee has been informed by the physician of the increased risk of lung cancer attributable to the combined effect of smoking and asbestos exposure.

(b) The employer shall instruct the physician not to reveal in the written opinion given to the employer specific findings or diagnoses unrelated to occupational exposure to asbestos.

(c) The employer shall provide a copy of the physician's written opinion to the affected employee within thirty days from its receipt.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 97-01-079, § 296-62-07725, filed 12/17/96, effective 3/1/97. Statutory Authority: Chapter 49.17 RCW. 91-03-044 (Order 90-18), § 296-62-07725, filed 1/10/91, effective 2/12/91; 89-11-035 (Order 89-03), § 296-62-07725, filed 5/15/89, effective 6/30/89; 87-24-051 (Order 87-24), § 296-62-07725, filed 11/30/87. Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-62-07725, filed 4/27/87.]

WAC 296-62-07727 Recordkeeping. (1) Exposure measurements.

(a) The employer shall keep an accurate record of all measurements taken to monitor employee exposure to asbestos as prescribed in WAC 296-62-07709.

(b) This record shall include at least the following information:

(i) Name of employer;

(ii) Name of person conducting monitoring;

(iii) The date of measurement;

(iv) Address of operation or activity;

(v) Description of the operation or activity involving exposure to asbestos that is being monitored;

(vi) Personal or area sample;

(vii) Name, Social Security number, and exposure level of the employees whose exposures are represented;

(viii) Type of protective devices worn, if any;

(ix) Pump calibration date and flow rate;

(x) Total volume of air sampled;

(xi) Name and address of analytical laboratory;

(xii) Number, duration, and results (f/cc) of samples taken;

(xiii) Date of analysis; and

(xiv) Sampling and analytical methods used and evidence of their accuracy.

(c) The employer shall maintain this record for the duration of employment plus thirty years, in accordance with WAC 296-62-052.

(2) Objective data for exempted operations.

(a) Where the processing, use, or handling of products made from or containing asbestos is exempted from other requirements of this section under WAC 296-62-07709 (2)(c), the employer shall establish and maintain an accurate record of objective data reasonably relied upon in support of the exemption.

(b) The record shall include at least the following:

(i) The product qualifying for exemption;

(ii) The source of the objective data;

(iii) The testing protocol, results of testing, and/or analysis of the material for the release of asbestos;

(iv) A description of the operation exempted and how the data support the exemption; and

(v) Other data relevant to the operations, materials, processing, or employee exposures covered by the exemption.

(c) The employer shall maintain this record for the duration of the employer's reliance upon such objective data.

Note: The employer may utilize the services of competent organizations such as industry trade associations and employee associations to maintain the records required by this section.

(3) Medical surveillance.

(a) The employer shall establish and maintain an accurate record for each employee subject to medical surveillance by WAC 296-62-07725 (1)(a), in accordance with WAC 296-62-052.

(b) The record shall include at least the following information:

(i) The name and Social Security number of the employee;

(ii) Physician's written opinions;

(iii) Any employee medical complaints related to exposure to asbestos;

(iv) A copy of the information provided to the physician as required by WAC 296-62-07725(6); and

(v) A copy of the employee's medical examination results, including the medical history, questionnaire responses, results of any tests, and physicians recommendations.

(c) The employer shall ensure that this record is maintained for the duration of employment plus thirty years, in accordance with WAC 296-62-052.

(4) Training. The employer shall maintain all employee training records for one year beyond the last date of employment of that employee.

(5) Availability.

(a) The employer, upon written request, shall make all records required to be maintained by this section available to the director for examination and copying.

(b) The employer, upon request, shall make any exposure records required by subsection (1) of this section available for examination and copying to affected employees,

former employees, designated representatives, and the director, in accordance with WAC 296-62-05201 through 296-62-05209 and 296-62-05213 through 296-62-05217.

(c) The employer, upon request, shall make employee medical records required by subsection (2) of this section available for examination and copying to the subject employee, to anyone having the specific written consent of the subject employee, and the director, in accordance with WAC 296-62-052.

(6) Transfer of records.

(a) The employer shall comply with the requirements concerning transfer of records set forth in WAC 296-62-05215.

(b) Whenever the employer ceases to do business and there is no successor employer to receive and retain the records for the prescribed period, the employer shall notify the director at least ninety days prior to disposal of records and, upon request, transmit them to the director.

(7) Data to rebut PACM. Where the building owner and employer have relied on data to demonstrate that PACM is not asbestos-containing, such data shall be maintained for as long as they are relied upon to rebut the presumption.

(8) Records of required notifications. Where the building owner has communicated and received information concerning the identification, location and quantity of ACM and PACM, written records of such notifications and their content shall be maintained by the building owner for the duration of ownership and shall be transferred to successive owners of such buildings/facilities.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 97-01-079, § 296-62-07727, filed 12/17/96, effective 3/1/97. Statutory Authority: Chapter 49.17 RCW. 87-24-051 (Order 87-24), § 296-62-07727, filed 11/30/87. Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-62-07727, filed 4/27/87.]

WAC 296-62-07728 Competent person. (1) General.

For all construction and shipyard work covered by this standard, the employer shall designate a competent person, having the qualifications and authorities for ensuring worker safety and health as required by chapter 296-155 WAC.

(2) Required inspections by the competent person. WAC 296-155-110(9) which requires health and safety prevention programs to provide for frequent and regular inspections on the job sites, materials, and equipment to be made by the competent person, is incorporated.

(3) Additional inspections. In addition, the competent person shall make frequent and regular inspections of the job sites in order to perform the duties set out below in this section. For Class I jobs, on-site inspections shall be made at least once during each work shift, and at any time at employee request. For Class II and III jobs, on-site inspections shall be made at intervals sufficient to assess whether conditions have changed, and at any reasonable time at employee request.

(a) On all worksites where employees are engaged in Class I or II asbestos work, the competent person designated in accordance with WAC 296-62-07712 shall perform or supervise the following duties, as applicable:

(i) Set up the regulated area, enclosure, or other containment;

(ii) Ensure (by on-site inspection) the integrity of the enclosure or containment;

(iii) Set up procedures to control entry and exit from the enclosure and/or area;

(iv) Supervise all employee exposure monitoring required by this section and ensure that it is conducted as required by WAC 296-62-07709;

(v) Ensure that employees working within the enclosure and/or using glovebags wear protective clothing and respirators as required by WAC 296-62-07715 and 296-62-07717;

(vi) Ensure through on-site supervision, that employees set up and remove engineering controls, use work practices and personal protective equipment in compliance with all requirements;

(vii) Ensure that employees use the hygiene facilities and observe the decontamination procedures specified in WAC 296-62-07719;

(viii) Ensure that through on-site inspection engineering controls are functioning properly and employees are using proper work practices; and

(ix) Ensure that notification requirements in WAC 296-62-07721 are met.

(4) Training for competent person.

(a) For Class I and II asbestos work the competent person shall be trained in all aspects of asbestos removal and handling, including: Abatement, installation, removal and handling, the contents of this standard, the identification of asbestos, removal procedures where appropriate, and other practices for reducing the hazard. Such training shall be the certified asbestos supervisor training specified in WAC 296-65-003, 296-65-012, and 296-65-030.

(b) For Class III and IV asbestos work:

(i) The competent person shall be certified as an asbestos supervisor as prescribed in WAC 296-65-012 and 296-65-030 for Class III and IV work involving 3 square feet or 3 linear feet or more of asbestos containing material.

(ii) For Class III and IV asbestos work involving less than 3 square feet or 3 linear feet of asbestos containing material, and asbestos work exempted from certification requirements in chapter 296-65 WAC, the competent person shall be trained in aspects of asbestos handling appropriate for the nature of the work, to include procedures for setting up glove bags and mini-enclosures, practices for reducing asbestos exposures, use of wet methods, the contents of this standard, and the identification of asbestos. Such training shall include successful completion of a course equivalent in curriculum and training method to the 16-hour Operations and Maintenance course developed by EPA for maintenance and custodial workers (see (b)(i) of this subsection) or its equivalent in stringency, content and length.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 97-01-079, § 296-62-07728, filed 12/17/96, effective 3/1/97.]

WAC 296-62-07733 Appendices. (1) Appendices A, C, D, E, and F to this part are incorporated as part of this section and the contents of these appendices are mandatory.

(2) Appendices B, G, H, I, J and K to this part are informational and are not intended to create any additional obligations not otherwise imposed or to detract from any existing obligations.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 97-01-079, § 296-62-07733, filed 12/17/96, effective 3/1/97. Statutory Authority: Chapter 49.17 RCW. 91-03-044 (Order 90-18), § 296-62-07733, filed 1/10/91, effective 2/12/91; 87-24-051 (Order 87-24), § 296-62-07733, filed 11/30/87. Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-62-07733, filed 4/27/87.]

WAC 296-62-07735 Appendix A—WISHA reference method—Mandatory. This mandatory appendix specifies the procedure for analyzing air samples for asbestos, tremolite, anthophyllite, and actinolite and specifies quality control procedures that must be implemented by laboratories performing the analysis. The sampling and analytical methods described below represent the elements of the available monitoring methods (such as Appendix B to this section, the most current version of the WISHA method ID-60, or the most current version of the NIOSH 7400 method) which WISHA considers to be essential to achieve adequate employee exposure monitoring while allowing employers to use methods that are already established within their organizations. All employers who are required to conduct air monitoring under WAC 296-62-07709 are required to utilize analytical laboratories that use this procedure, or an equivalent method, for collecting and analyzing samples.

(1) Sampling and analytical procedure.

(a) The sampling medium for air samples shall be mixed cellulose ester filter membranes. These shall be designated by the manufacturer as suitable for asbestos, tremolite, anthophyllite, and actinolite counting. See below for rejection of blanks.

(b) The preferred collection device shall be the 25-mm diameter cassette with an open-faced 50-mm electrically conductive extension cowl. The 37-mm cassette may be used if necessary but only if written justification for the need to use the 37-mm filter cassette accompanies the sample results in the employee's exposure monitoring record. Do not reuse or reload cassettes for asbestos sample collection.

(c) An air flow rate between 0.5 liter/min and 2.5 liters/min shall be selected for the 25-mm cassette. If the 37-mm cassette is used, an air flow rate between 1 liter/min and 4.0 liters/min shall be selected.

(d) Where possible, a sufficient air volume for each air sample shall be collected to yield between one hundred and one thousand three hundred fibers per square millimeter on the membrane filter. If a filter darkens in appearance or if loose dust is seen on the filter, a second sample shall be started.

(e) Ship the samples in a rigid container with sufficient packing material to prevent dislodging the collected fibers. Packing material that has a high electrostatic charge on its surface (e.g., expanded polystyrene) cannot be used because such material can cause loss of fibers to the sides of the cassette.

(f) Calibrate each personal sampling pump before and after use with a representative filter cassette installed between the pump and the calibration devices.

(g) Personal samples shall be taken in the "breathing zone" of the employee (i.e., attached to or near the collar or lapel near the worker's face).

(h) Fiber counts shall be made by positive phase contrast using a microscope with an 8 to 10 X eyepiece and

a 40 to 45 X objective for a total magnification of approximately 400 X and a numerical aperture of 0.65 to 0.75. The microscope shall also be fitted with a green or blue filter.

(i) The microscope shall be fitted with a Walton-Beckett eyepiece graticule calibrated for a field diameter of one hundred micrometers (+/-2 micrometers).

(j) The phase-shift detection limit of the microscope shall be about 3 degrees measured using the HSE phase shift test slide as outlined below.

(i) Place the test slide on the microscope stage and center it under the phase objective.

(ii) Bring the blocks of grooved lines into focus.

Note: The slide consists of seven sets of grooved lines (ca. 20 grooves to each block) in descending order of visibility from sets one to seven, seven being the least visible. The requirements for asbestos, tremolite, anthophyllite, and actinolite counting are that the microscope optics must resolve the grooved lines in set three completely, although they may appear somewhat faint, and that the grooved lines in sets six and seven must be invisible. Sets four and five must be at least partially visible but may vary slightly in visibility between microscopes. A microscope that fails to meet these requirements has either too low or too high a resolution to be used for asbestos, tremolite, anthophyllite, and actinolite counting.

(iii) If the image deteriorates, clean and adjust the microscope optics. If the problem persists, consult the microscope manufacturer.

(k) Each set of samples taken will include ten percent blanks or a minimum of two blanks. These blanks must come from the same lot as the filters used for sample collection. The field blank results shall be averaged and subtracted from the analytical results before reporting. Any samples represented by a blank having a fiber count in excess of the detection limit of the method being used shall be rejected.

(l) The samples shall be mounted by the acetone/triacetin method or a method with an equivalent index of refraction and similar clarity.

(m) Observe the following counting rules.

(i) Count only fibers equal to or longer than five micrometers. Measure the length of curved fibers along the curve.

(ii) Count all particles as asbestos, tremolite, anthophyllite, and actinolite that have a length-to-width ratio (aspect ratio) of three to one or greater.

(iii) Fibers lying entirely within the boundary of the Walton-Beckett graticule field shall receive a count of one. Fibers crossing the boundary once, having one end within the circle, shall receive the count of one-half. Do not count any fiber that crosses the graticule boundary more than once. Reject and do not count any other fibers even though they may be visible outside the graticule area.

(iv) Count bundles of fibers as one fiber unless individual fibers can be identified by observing both ends of an individual fiber.

(v) Count enough graticule fields to yield 100 fibers. Count a minimum of 20 fields; stop counting at 100 fields regardless of fiber count.

(n) Blind recounts shall be conducted at the rate of ten percent.

(2) Quality control procedures.

(a) Intralaboratory program. Each laboratory and/or each company with more than one microscopist counting slides shall establish a statistically designed quality assurance program involving blind recounts and comparisons between microscopists to monitor the variability of counting by each microscopist and between microscopists. In a company with more than one laboratory, the program shall include all laboratories and shall also evaluate the laboratory-to-laboratory variability.

(b) Interlaboratory program.

(i) Each laboratory analyzing asbestos, tremolite, anthophyllite, and actinolite samples for compliance determination shall implement an interlaboratory quality assurance program that as a minimum includes participation of at least two other independent laboratories. Each laboratory shall participate in round robin testing at least once every six months with at least all the other laboratories in its interlaboratory quality assurance group. Each laboratory shall submit slides typical of its own work load for use in this program. The round robin shall be designed and results analyzed using appropriate statistical methodology.

(ii) All laboratories should participate in a national sample testing scheme such as the Proficiency Analytical Testing Program (PAT), the Asbestos Registry sponsored by the American Industrial Hygiene Association (AIHA).

(c) All individuals performing asbestos, tremolite, anthophyllite, and actinolite analysis must have taken the NIOSH course for sampling and evaluating airborne asbestos, tremolite, anthophyllite, and actinolite dust or an equivalent course, recognized by the department.

(d) When the use of different microscopes contributes to differences between counters and laboratories, the effect of the different microscope shall be evaluated and the microscope shall be replaced, as necessary.

(e) Current results of these quality assurance programs shall be posted in each laboratory to keep the microscopists informed.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 97-01-079, § 296-62-07735, filed 12/17/96, effective 3/1/97. Statutory Authority: Chapter 49.17 RCW. 87-24-051 (Order 87-24), § 296-62-07735, filed 11/30/87. Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-62-07735, filed 4/27/87.]

WAC 296-62-07737 Appendix B—Detailed procedure for asbestos sampling and analysis—Nonmandatory.

Air

Matrix:

WISHA Permissible Exposure Limits:

Time Weighted Average 0.1 fiber/cc

Excursion Level (30 minutes) 1.0 fiber/cc

Collection Procedure:

A known volume of air is drawn through a 25-mm diameter cassette containing a mixed-cellulose ester filter. The cassette must be equipped with an electrically conductive 50-mm extension cowl. The sampling time and rate are chosen to give a fiber density of between 100 to 1,300 fibers/mm² on the filter.

Recommended Sampling Rate 0.5 to 5.0 liters/minute (L/min)

(1997 Ed.)

Recommended Air Volumes:

Minimum 25 L

Maximum 2,400 L

Analytical Procedure: A portion of the sample filter is cleared and prepared for asbestos fiber counting by Phase Contrast Microscopy (PCM) at 400X. Commercial manufacturers and products mentioned in this method are for descriptive use only and do not constitute endorsements by WISHA. Similar products from other sources can be substituted.

Introduction.

This method describes the collection of airborne asbestos fibers using calibrated sampling pumps with mixed-cellulose ester (MCE) filters and analysis by phase contrast microscopy (PCM). Some terms used are unique to this method and are defined below:

Asbestos: A term for naturally occurring fibrous minerals. Asbestos includes chrysotile, crocidolite, amosite (cummingtonite-grunerite asbestos), tremolite asbestos, actinolite asbestos, anthophyllite asbestos, and any of these minerals that have been chemically treated and/or altered. The precise chemical formulation of each species will vary with the location from which it was mined. Nominal compositions are listed:

Chrysotile	$Mg_3Si_2O_5(OH)_4$
Crocidolite	$Na_2Fe_3^{2+}Fe_2^{3+}Si_8O_{22}(OH)_2$
Amosite	$(Mg,Fe)_7Si_8O_{22}(OH)_2$
Tremolite-actinolite	$Ca_2(Mg,Fe)_5Si_8O_{22}(OH)_2$
Anthophyllite	$(Mg,Fe)_7Si_8O_{22}(OH)_2$

Asbestos Fiber: A fiber of asbestos which meets the criteria specified below for a fiber.

Aspect Ratio: The ratio of the length of a fiber to its diameter (e.g. 3:1, 5:1 aspect ratios).

Cleavage Fragments: Mineral particles formed by comminution of minerals, especially those characterized by parallel sides and a moderate aspect ratio (usually less than 20:1).

Detection Limit: The number of fibers necessary to be 95% certain that the result is greater than zero.

Differential Counting: The term applied to the practice of excluding certain kinds of fibers from the fiber count because they do not appear to be asbestos.

Fiber: A particle that is 5 µm or longer, with a length-to-width ratio of 3 to 1 or longer.

Field: The area within the graticule circle that is superimposed on the microscope image.

Set: The samples which are taken, submitted to the laboratory, analyzed, and for which, interim or final result reports are generated.

Tremolite, Anthophyllite, and Actinolite: The non-asbestos form of these minerals which meet the definition of a fiber. It includes any of these minerals that have been chemically treated and/or altered.

Walton-Beckett Graticule: An eyepiece graticule specifically designed for asbestos fiber counting. It consists of a circle with a projected diameter of 100 ± 2 µm (area of about 0.00785 mm²) with a crosshair having tic-marks at 3-µm intervals in one direction and 5-µm in the orthogonal direction. There are marks around the periphery of the circle

to demonstrate the proper sizes and shapes of fibers. The disk is placed in one of the microscope eyepieces so that the design is superimposed on the field of view.

1. History.

(a) Early surveys to determine asbestos exposures were conducted using impinger counts of total dust with the counts expressed as million particles per cubic foot. The British Asbestos Research Council recommended filter membrane counting in 1969. In July 1969, the Bureau of Occupational Safety and Health published a filter membrane method for counting asbestos fibers in the United States. This method was refined by NIOSH and published as P & CAM 239. On May 29, 1971, OSHA specified filter membrane sampling with phase contrast counting for evaluation of asbestos exposures at work sites in the United States. The use of this technique was again required by OSHA in 1986. Phase contrast microscopy has continued to be the method of choice for the measurement of occupational exposure to asbestos.

(b) Principle. Air is drawn through a MCE filter to capture airborne asbestos fibers. A wedge shaped portion of the filter is removed, placed on a glass microscope slide and made transparent. A measured area (field) is viewed by PCM. All the fibers meeting a defined criteria for asbestos are counted and considered a measure of the airborne asbestos concentration.

(c) Advantages and Disadvantages

(i) There are four main advantages of PCM over other methods:

(A) The technique is specific for fibers. Phase contrast is a fiber counting technique which excludes non-fibrous particles from the analysis.

(B) The technique is inexpensive and does not require specialized knowledge to carry out the analysis for total fiber counts.

(C) The analysis is quick and can be performed on-site for rapid determination of air concentrations of asbestos fibers.

(D) The technique has continuity with historical epidemiological studies so that estimates of expected disease can be inferred from long-term determinations of asbestos exposures.

(ii) The main disadvantage of PCM is that it does not positively identify asbestos fibers. Other fibers which are not asbestos may be included in the count unless differential counting is performed. This requires a great deal of experience to adequately differentiate asbestos from non-asbestos fibers. Positive identification of asbestos must be performed by polarized light or electron microscopy techniques. A further disadvantage of PCM is that the smallest visible fibers are about 0.2 μm in diameter while the finest asbestos fibers may be as small as 0.02 μm in diameter. For some exposures, substantially more fibers may be present than are actually counted.

(d) Workplace Exposure. Asbestos is used by the construction industry in such products as shingles, floor tiles, asbestos cement, roofing felts, insulation and acoustical products. Non-construction uses include brakes, clutch facings, paper, paints, plastics, and fabrics. One of the most significant exposures in the workplace is the removal and

encapsulation of asbestos in schools, public buildings, and homes. Many workers have the potential to be exposed to asbestos during these operations. About 95% of the asbestos in commercial use in the United States is chrysotile. Crocidolite and amosite make up most of the remainder. Anthophyllite and tremolite or actinolite are likely to be encountered as contaminants in various industrial products.

(e) Physical Properties. Asbestos fiber possesses a high tensile strength along its axis, is chemically inert, non-combustible, and heat resistant. It has a high electrical resistance and good sound absorbing properties. It can be weaved into cables, fabrics or other textiles, and also matted into asbestos papers, felts, or mats.

2. Range and Detection Limit.

(a) The ideal counting range on the filter is 100 to 1,300 fibers/mm². With a Walton-Beckett graticule this range is equivalent to 0.8 to 10 fibers/field. Using NIOSH counting statistics, a count of 0.8 fibers/field would give an approximate coefficient of variation (CV) of 0.13.

(b) The detection limit for this method is 4.0 fibers per 100 fields or 5.5 fibers/mm². This was determined using an equation to estimate the maximum CV possible at a specific concentration (95% confidence) and a Lower Control Limit of zero. The CV value was then used to determine a corresponding concentration from historical CV vs fiber relationships. As an example:

$$\text{Lower Control Limit (95\% Confidence)} = AC - 1.645(CV)(AC)$$

Where:

AC = Estimate of the airborne fiber concentration (fibers/cc) Setting the Lower Control Limit = 0 and solving for CV:

$$0 = AC - 1.645(CV)(AC)$$

$$CV = 0.61$$

This value was compared with CV vs. count curves. The count at which CV = 0.61 for Leidel-Busch counting statistics 8(i) or for an OSHA Salt Lake Technical Center (OSHA-SLTC) CV curve (see Appendix A for further information) was 4.4 fibers or 3.9 fibers per 100 fields, respectively. Although a lower detection limit of 4 fibers per 100 fields is supported by the OSHA-SLTC data, both data sets support the 4.5 fibers per 100 fields value.

3. Method Performance—Precision and Accuracy. Precision is dependent upon the total number of fibers counted and the uniformity of the fiber distribution on the filter. A general rule is to count at least 20 and not more than 100 fields. The count is discontinued when 100 fibers are counted, provided that 20 fields have already been counted. Counting more than 100 fibers results in only a small gain in precision. As the total count drops below 10 fibers, an accelerated loss of precision is noted. At this time, there is no known method to determine the absolute accuracy of the asbestos analysis. Results of samples prepared through the Proficiency Analytical Testing (PAT) Program and analyzed by the OSHA-SLTC showed no significant bias when compared to PAT reference values. The PAT samples were analyzed from 1987 to 1989 (N=36) and the concentration range was from 120 to 1,300 fibers/mm².

4. Interferences. Fibrous substances, if present, may interfere with asbestos analysis. Some common fibers are:

Fiber glass
Perlite veins.
Anhydrite plant fibers
gypsum
Some synthetic fibers.
Membrane structures
Sponge spicules and diatoms.
Microorganisms
Wollastonite.

The use of electron microscopy or optical tests such as polarized light, and dispersion staining may be used to differentiate these materials from asbestos when necessary.

5. Sampling.

(a) Equipment.

(i) Sample assembly. Conductive filter holder consisting of a 25-mm diameter, 3-piece cassette having a 50-mm long electrically conductive extension cowl. Backup pad, 25-mm, cellulose. Membrane filter, mixed-cellulose ester (MCE), 25-mm, plain, white, 0.8- to 1.2- μ m pore size.

Notes: (A) DO NOT RE-USE CASSETTES.

(B) Fully conductive cassettes are required to reduce fiber loss to the sides of the cassette due to electrostatic attraction.

(C) Purchase filters which have been selected by the manufacturer for asbestos counting or analyze representative filters for fiber background before use. Discard the filter lot if more than 4 fibers/100 fields are found.

(D) To decrease the possibility of contamination, the sampling system (filter-backup pad-cassette) for asbestos is usually preassembled by the manufacturer.

(ii) Gel bands for sealing cassettes.

(iii) Sampling pump. Each pump must be a battery operated, self-contained unit small enough to be placed on the monitored employee and not interfere with the work being performed. The pump must be capable of sampling at 2.5 liters per minute (L/min) for the required sampling time.

(iv) Flexible tubing, 6-mm bore.

(v) Pump calibration. Stopwatch and bubble tube/burette or electronic meter.

(b) Sampling Procedure.

(i) Seal the point where the base and cowl of each cassette meet with a gel band or tape.

(ii) Charge the pumps completely before beginning.

(iii) Connect each pump to a calibration cassette with an appropriate length of 6-mm bore plastic tubing. Do not use luer connectors—the type of cassette specified above has built-in adapters.

(iv) Select an appropriate flow rate for the situation being monitored. The sampling flow rate must be between 0.5 and 5.0 L/min for personal sampling and is commonly set between 1 and 2 L/min. Always choose a flow rate that will not produce overloaded filters.

(v) Calibrate each sampling pump before and after sampling with a calibration cassette in-line (Note: This calibration cassette should be from the same lot of cassettes used for sampling). Use a primary standard (e.g. bubble burette) to calibrate each pump. If possible, calibrate at the sampling site.

Note: If sampling site calibration is not possible, environmental influences may affect the flow rate. The extent is dependent on the type of pump used. Consult with the pump manufacturer to

determine dependence on environmental influences. If the pump is affected by temperature and pressure changes, use the formula in Appendix B to this section to calculate the actual flow rate.

(vi) Connect each pump to the base of each sampling cassette with flexible tubing. Remove the end cap of each cassette and take each air sample open face. Assure that each sample cassette is held open side down in the employee's breathing zone during sampling. The distance from the nose/mouth of the employee to the cassette should be about 10 cm. Secure the cassette on the collar or lapel of the employee using spring clips or other similar devices.

(vii) A suggested minimum air volume when sampling to determine TWA compliance is 25 L. For Excursion Limit (30 min sampling time) evaluations, a minimum air volume of 48 L is recommended.

(viii) The most significant problem when sampling for asbestos is overloading the filter with non-asbestos dust. Suggested maximum air sample volumes for specific environments are:

Type of asbestos	Index of refraction
Chrysotile.....	n=1.550.
Amosite	n=1.670 r 1.680.
Crocidolite	n=1.690.
Anthophyllite	n=1.605 nd 1.620.
Tremolite	n=1.605 and 1.620
Actinolite	n=1.620

Caution: Do not overload the filter with dust. High levels of non-fibrous dust particles may obscure fibers on the filter and lower the count or make counting impossible. If more than about 25 to 30% of the field area is obscured with dust, the result may be biased low. Smaller air volumes may be necessary when there is excessive non-asbestos dust in the air. While sampling, observe the filter with a small flashlight. If there is a visible layer of dust on the filter, stop sampling, remove and seal the cassette, and replace with a new sampling assembly. The total dust loading should not exceed 1 mg.

(ix) Blank samples are used to determine if any contamination has occurred during sample handling. Prepare two blanks for the first 1 to 20 samples. For sets containing greater than 20 samples, prepare blanks as 10% of the samples. Handle blank samples in the same manner as air samples with one exception: Do not draw any air through the blank samples. Open the blank cassette in the place where the sample cassettes are mounted on the employee. Hold it open for about 30 seconds. Close and seal the cassette appropriately. Store blanks for shipment with the sample cassettes.

(x) Immediately after sampling, close and seal each cassette with the base and plastic plugs. Do not touch or puncture the filter membrane as this will invalidate the analysis.

(xi) Attach a seal (OSHA-21 or equivalent) around each cassette in such a way as to secure the end cap plug and base plug. Tape the ends of the seal together since the seal is not long enough to be wrapped end-to-end. Also wrap tape around the cassette at each joint to keep the seal secure.

(c) Sample Shipment.

(i) Send the samples to the laboratory with paperwork requesting asbestos analysis. List any known fibrous

interferences present during sampling on the paperwork. Also, note the workplace operation(s) sampled.

(ii) Secure and handle the samples in such that they will not rattle during shipment nor be exposed to static electricity. Do not ship samples in expanded polystyrene peanuts, vermiculite, paper shreds, or excelsior. Tape sample cassettes to sheet bubbles and place in a container that will cushion the samples without rattling.

(iii) To avoid the possibility of sample contamination, always ship bulk samples in separate mailing containers.

6. Analysis.

(a) Safety Precautions.

(i) Acetone is extremely flammable and precautions must be taken not to ignite it. Avoid using large containers or quantities of acetone. Transfer the solvent in a ventilated laboratory hood. Do not use acetone near any open flame. For generation of acetone vapor, use a spark free heat source.

(ii) Any asbestos spills should be cleaned up immediately to prevent dispersal of fibers. Prudence should be exercised to avoid contamination of laboratory facilities or exposure of personnel to asbestos. Asbestos spills should be cleaned up with wet methods and/or a High Efficiency Particulate-Air (HEPA) filtered vacuum.

Caution: Do not use a vacuum without a HEPA filter—It will disperse fine asbestos fibers in the air.

(b) Equipment.

(i) Phase contrast microscope with binocular or trinocular head.

(ii) Widefield or Huygenian 10X eyepieces (NOTE: The eyepiece containing the graticule must be a focusing eyepiece. Use a 40X phase objective with a numerical aperture of 0.65 to 0.75).

(iii) Kohler illumination (if possible) with green or blue filter.

(iv) Walton-Beckett Graticule, type G-22 with 100 ± 2 μ m projected diameter.

(v) Mechanical stage. A rotating mechanical stage is convenient for use with polarized light.

(vi) Phase telescope.

(vii) Stage micrometer with 0.01-mm subdivisions.

(viii) Phase-shift test slide, mark II (Available from PTR optics Ltd., and also McCrone).

(ix) Precleaned glass slides, 25 mm X 75 mm. One end can be frosted for convenience in writing sample numbers, etc., or paste-on labels can be used.

(x) Cover glass #1-1/2.

(xi) Scalpel (#10, curved blade).

(xii) Fine tipped forceps.

(xiii) Aluminum block for clearing filter.

(xiv) Automatic adjustable pipette, 100- to 500- μ L.

(xv) Micropipette, 5 μ L.

(c) Reagents.

(i) Acetone (HPLC grade).

(ii) Triacetin (glycerol triacetate).

(iii) Lacquer or nail polish.

(d) Standard Preparation. A way to prepare standard asbestos samples of known concentration has not been developed. It is possible to prepare replicate samples of

nearly equal concentration. This has been performed through the PAT program. These asbestos samples are distributed by the AIHA to participating laboratories. Since only about one-fourth of a 25-mm sample membrane is required for an asbestos count, any PAT sample can serve as a "standard" for replicate counting.

(e) Sample Mounting.

Note: See Safety Precautions in (6)(a) before proceeding. The objective is to produce samples with a smooth (non-grainy) background in a medium with a refractive index of approximately 1.46. The technique below collapses the filter for easier focusing and produces permanent mounts which are useful for quality control and interlaboratory comparison. An aluminum block or similar device is required for sample preparation.

(i) Heat the aluminum block to about 70°C. The hot block should not be used on any surface that can be damaged by either the heat or from exposure to acetone.

(ii) Ensure that the glass slides and cover glasses are free of dust and fibers.

(iii) Remove the top plug to prevent a vacuum when the cassette is opened. Clean the outside of the cassette if necessary. Cut the seal and/or tape on the cassette with a razor blade. Very carefully separate the base from the extension cowl, leaving the filter and backup pad in the base.

(iv) With a rocking motion cut a triangular wedge from the filter using the scalpel. This wedge should be one-sixth to one-fourth of the filter. Grasp the filter wedge with the forceps on the perimeter of the filter which was clamped between the cassette pieces. DO NOT TOUCH the filter with your finger. Place the filter on the glass slide sample side up. Static electricity will usually keep the filter on the slide until it is cleared.

(v) Place the tip of the micropipette containing about 200 μ L acetone into the aluminum block. Insert the glass slide into the receiving slot in the aluminum block. Inject the acetone into the block with slow, steady pressure on the plunger while holding the pipette firmly in place. Wait 3 to 5 seconds for the filter to clear, then remove the pipette and slide from the aluminum block.

(vi) Immediately (less than 30 seconds) place 2.5 to 3.5 μ L of triacetin on the filter (Note: Waiting longer than 30 seconds will result in increased index of refraction and decreased contrast between the fibers and the preparation. This may also lead to separation of the cover slip from the slide).

(vii) Lower a cover slip gently onto the filter at a slight angle to reduce the possibility of forming air bubbles. If more than 30 seconds have elapsed between acetone exposure and triacetin application, glue the edges of the cover slip to the slide with lacquer or nail polish.

(viii) If clearing is slow, warm the slide for 15 min on a hot plate having a surface temperature of about 50°C to hasten clearing. The top of the hot block can be used if the slide is not heated too long.

(ix) Counting may proceed immediately after clearing and mounting are completed.

(f) Sample Analysis. Completely align the microscope according to the manufacturer's instructions. Then, align the microscope using the following general alignment routine at the beginning of every counting session and more often if necessary.

(i) Alignment.

(A) Clean all optical surfaces. Even a small amount of dirt can significantly degrade the image.

(B) Rough focus the objective on a sample.

(C) Close down the field iris so that it is visible in the field of view. Focus the image of the iris with the condenser focus. Center the image of the iris in the field of view.

(D) Install the phase telescope and focus on the phase rings. Critically center the rings. Misalignment of the rings results in astigmatism which will degrade the image.

(E) Place the phase-shift test slide on the microscope stage and focus on the lines. The analyst must see line set 3 and should see at least parts of 4 and 5 but, not see line set 6 or 6. A microscope/microscopist combination which does not pass this test may not be used.

(ii) Counting Fibers.

(A) Place the prepared sample slide on the mechanical stage of the microscope. Position the center of the wedge under the objective lens and focus upon the sample.

(B) Start counting from one end of the wedge and progress along a radial line to the other end (count in either direction from perimeter to wedge tip). Select fields randomly, without looking into the eyepieces, by slightly advancing the slide in one direction with the mechanical stage control.

(C) Continually scan over a range of focal planes (generally the upper 10 to 15 μm of the filter surface) with the fine focus control during each field count. Spend at least 5 to 15 seconds per field.

(D) Most samples will contain asbestos fibers with fiber diameters less than 1 μm . Look carefully for faint fiber images. The small diameter fibers will be very hard to see. However, they are an important contribution to the total count.

(E) Count only fibers equal to or longer than 5 μm . Measure the length of curved fibers along the curve.

(F) Count fibers which have a length to width ratio of 3:1 or greater.

(G) Count all the fibers in at least 20 fields. Continue counting until either 100 fibers are counted or 100 fields have been viewed; whichever occurs first. Count all the fibers in the final field.

(H) Fibers lying entirely within the boundary of the Walton-Beckett graticule field shall receive a count of 1. Fibers crossing the boundary once, having one end within the circle shall receive a count of 1/2. Do not count any fiber that crosses the graticule boundary more than once. Reject and do not count any other fibers even though they may be visible outside the graticule area. If a fiber touches the circle, it is considered to cross the line.

(I) Count bundles of fibers as one fiber unless individual fibers can be clearly identified and each individual fiber is clearly not connected to another counted fiber.

(J) Record the number of fibers in each field in a consistent way such that filter non-uniformity can be assessed.

(K) Regularly check phase ring alignment.

(L) When an agglomerate (mass of material) covers more than 25% of the field of view, reject the field and select another. Do not include it in the number of fields counted.

(M) Perform a "blind recount" of 1 in every 10 filter wedges (slides). Re-label the slides using a person other than the original counter.

(g) Fiber Identification. As previously mentioned in (1)(c), PCM does not provide positive confirmation of asbestos fibers. Alternate differential counting techniques should be used if discrimination is desirable. Differential counting may include primary discrimination based on morphology, polarized light analysis of fibers, or modification of PCM data by Scanning Electron or Transmission Electron Microscopy. A great deal of experience is required to routinely and correctly perform differential counting. It is discouraged unless it is legally necessary. Then, only if a fiber is obviously not asbestos should it be excluded from the count. Further discussion of this technique can be found in reference 8(j). If there is a question whether a fiber is asbestos or not, follow the rule: "WHEN IN DOUBT, COUNT."

(h) Analytical Recommendations—Quality Control System.

(i) All individuals performing asbestos analysis must have taken the NIOSH course for sampling and evaluating airborne asbestos or an equivalent course.

(ii) Each laboratory engaged in asbestos counting shall set up a slide trading arrangement with at least two other laboratories in order to compare performance and eliminate inbreeding of error. The slide exchange occurs at least semiannually. The round robin results shall be posted where all analysts can view individual analyst's results.

(iii) Each laboratory engaged in asbestos counting shall participate in the Proficiency Analytical Testing Program, the Asbestos Analyst Registry or equivalent.

(iv) Each analyst shall select and count prepared slides from a "slide bank". These are quality assurance counts. The slide bank shall be prepared using uniformly distributed samples taken from the workload. Fiber densities should cover the entire range routinely analyzed by the laboratory. These slides are counted blind by all counters to establish an original standard deviation. This historical distribution is compared with the quality assurance counts. A counter must have 95% of all quality control samples counted within three standard deviations of the historical mean. This count is then integrated into a new historical mean and standard deviation for the slide. The analyses done by the counters to establish the slide bank may be used for an interim quality control program if the data are treated in a proper statistical fashion.

7. Calculations.

(a) Calculate the estimated airborne asbestos fiber concentration on the filter sample using the following formula:

$$AC = \frac{\left[\frac{FB}{FL} - \frac{BFB}{BFL} \right] \times ECA}{1000 \times FR \times T \times MFA}$$

Where:

AC = Airborne fiber concentration

FB	=	Total number of fibers greater than 5 μm counted
FL	=	Total number of fields counted on the filter
BFB	=	Total number of fibers greater than 5 μm counted in the blank
BFL	=	Total number of fields counted on the blank
ECA	=	Effective collecting area of filter (385 mm^2 nominal for a 25-mm filter.)
FR	=	Pump flow rate (L/min)
MFA	=	Microscope count field area (mm^2). This is 0.00785 mm^2 for a Walton-Beckett Graticule.
T	=	Sample collection time (min)
1,000	=	Conversion of L to cc

Note: The collection area of a filter is seldom equal to 385 mm^2 . It is appropriate for laboratories to routinely monitor the exact diameter using an inside micrometer. The collection area is calculated according to the formula:

$$\text{Area} = \pi(d/2)^2$$

(b) Short-cut Calculation

Since a given analyst always has the same interpupillary distance, the number of fields per filter for a particular analyst will remain constant for a given size filter. The field size for that analyst is constant (i.e. the analyst is using an assigned microscope and is not changing the reticle). For example, if the exposed area of the filter is always 385 mm^2 and the size of the field is always 0.00785 mm^2 , the number of fields per filter will always be 49,000. In addition it is necessary to convert liters of air to cc. These three constants can then be combined such that $ECA/(1,000 \times MFA) = 49$. The previous equation simplifies to:

$$AC = \frac{\left(\frac{FB}{FL}\right) - \left(\frac{BFB}{BFL}\right) \times 49}{FR \times T}$$

(c) Recount Calculations. As mentioned in step 13 of 6 (f)(ii), a "blind recount" of 10% of the slides is performed. In all cases, differences will be observed between the first and second counts of the same filter wedge. Most of these differences will be due to chance alone, that is, due to the random variability (precision) of the count method. Statistical recount criteria enables one to decide whether observed differences can be explained due to chance alone or are probably due to systematic differences between analysts, microscopes, or other biasing factors. The following recount criterion is for a pair of counts that estimate AC in fibers/cc. The criterion is given at the type-I error level. That is, there is 5% maximum risk that we will reject a pair of counts for the reason that one might be biased, when the large observed difference is really due to chance. Reject a pair of counts if:

$$\left| \sqrt{AC_2} - \sqrt{AC_1} \right| > 2.78 \times \left(\sqrt{AC_{\text{avg}}} \right) \times CV_{FB}$$

Where:

AC_1	=	lower estimated airborne fiber concentration
AC_2	=	higher estimated airborne fiber concentration
AC_{avg}	=	average of the two concentration estimates
CV_{FB}	=	CV for the average of the two concentration estimates

If a pair of counts are rejected by this criterion then, recount the rest of the filters in the submitted set. Apply the test and reject any other pairs failing the test. Rejection shall include a memo to the industrial hygienist stating that the sample failed a statistical test for homogeneity and the true air concentration may be significantly different than the reported value.

(d) Reporting Results. Report results to the industrial hygienist as fibers/cc. Use two significant figures. If multiple analyses are performed on a sample, an average of the results is to be reported unless any of the results can be rejected for cause.

8. References.

(a) Dreesen, W.C., et al, U.S. Public Health Service: A Study of Asbestosis in the Asbestos Textile Industry, (Public Health Bulletin No. 241), US Treasury Dept., Washington, DC, 1938.

(b) Asbestos Research Council: The Measurement of Airborne Asbestos Dust by the Membrane Filter Method (Technical Note), Asbestos Research Council, Rockdale, Lancashire, Great Britain, 1969.

(c) Bayer, S.G., Zumwalde, R.D., Brown, T.A., Equipment and Procedure for Mounting Millipore Filters and Counting Asbestos Fibers by Phase Contrast Microscopy, Bureau of Occupational Health, U.S. Dept. of Health, Education and Welfare, Cincinnati, OH, 1969.

(d) NIOSH Manual of Analytical Methods, 2nd ed., Vol. 1 (DHEW/NIOSH Pub. No. 77-157-A). National Institute for Occupational Safety and Health, Cincinnati, OH, 1977, pp.239-1-239-21.

(e) Asbestos, Code of Federal Regulations 29 CFR 1910.1001. 1971.

(f) Occupational Exposure to Asbestos, Tremolite, Anthophyllite, and Actinolite. Final Rule, Federal Register 51: 119 (20 June 1986). pp.22612-22790.

(g) Asbestos, Tremolite, Anthophyllite, and Actinolite, Code of Federal Regulations 1910.1001. 1988. pp 711-752.

(h) Criteria for a Recommended Standard—Occupational Exposure to Asbestos (DHEW/NIOSH Pub. No. HSM 72-10267), National Institute for Occupational Safety and Health NIOSH, Cincinnati, OH, 1972. pp. III-1-III-24.

(i) Leidel, N.A., Bayer, S.G., Zumwalde, R.D., Busch, K.A., USPHS/NIOSH Membrane Filter Method for Evaluating Airborne Asbestos Fibers (DHEW/NIOSH Pub. No. 79-

127). National Institute for Occupational Safety and Health, Cincinnati, OH, 1979.

(j) Dixon, W.C., Applications of Optical Microscopy in Analysis of Asbestos and Quartz, Analytical Techniques in Occupational Health Chemistry, edited by D.D. Dollberg and A.W. Verstuyft. Wash. D.C.: American Chemical Society, (ACS Symposium Series 120) 1980. pp. 13-41.

9. Quality Control. The OSHA asbestos regulations require each laboratory to establish a quality control program. The following is presented as an example of how the OSHA-SLTC constructed its internal CV curve as part of meeting this requirement. Data for the CV curve shown below is from 395 samples collected during OSHA compliance inspections and analyzed from October 1980 through April 1986. Each sample was counted by 2 to 5 different counters independently of one another. The standard deviation and the CV statistic was calculated for each sample. This data was then plotted on a graph of CV vs. fibers/mm². A least squares regression was performed using the following equation:

$$CV = \text{antilog}_{10}[A(\log_{10}(x))^2 + B(\log_{10}(x)) + C]$$

Where:

x = the number of fibers/mm²

Application of least squares gave:

$$A = 0.182205$$

$$B = -0.973343$$

$$C = 0.327499$$

Using these values, the equation becomes:

$$CV = \text{antilog}_{10}[0.182205(\log_{10}(x))^2 - 0.973343(\log_{10}(x)) + 0.327499]$$

10. Sampling Pump Flow Rate Corrections. This correction is used if a difference greater than 5% in ambient temperature and/or pressure is noted between calibration and sampling sites and the pump does not compensate for the differences.

$$Q_{\text{act}} = Q_{\text{cal}} \times \sqrt{\left(\frac{P_{\text{cal}}}{P_{\text{act}}}\right) \times \left(\frac{T_{\text{act}}}{T_{\text{cal}}}\right)}$$

Where:

Q_{act}	=	actual flow rate
Q_{cal}	=	calibrated flow rate (if a rotameter was used, the rotameter value)
P_{cal}	=	uncorrected air pressure at calibration
P_{act}	=	uncorrected air pressure at sampling site
T_{act}	=	temperature at sampling site (K)
T_{cal}	=	temperature at calibration (K)

11. Walton-Beckett Graticule

When ordering the Graticule for asbestos counting, specify the exact disc diameter needed to fit the ocular of the microscope and the diameter (mm) of the circular counting

area. Instructions for measuring the dimensions necessary are listed:

(a) Insert any available graticule into the focusing eyepiece and focus so that the graticule lines are sharp and clear.

(b) Align the microscope.

(c) Place a stage micrometer on the microscope object stage and focus the microscope on the graduated lines.

(d) Measure the magnified grid length, PL (μm), using the stage micrometer.

(e) Remove the graticule from the microscope and measure its actual grid length, AL (mm). This can be accomplished by using a mechanical stage fitted with verniers, or a jeweler's loupe with a direct reading scale.

(f) Let D=100 μm. Calculate the circle diameter, d_c (mm), for the Walton-Beckett graticule and specify the diameter when making a purchase:

$$d_c = \frac{AL \times D}{PL}$$

Example: If PL=108 μm, AL=2.93 mm and D=100 μm, then,

$$d_c = (2.93 \times 100)/108 = 2.71 \text{ mm}$$

(g) Each eyepiece-objective-reticle combination on the microscope must be calibrated. Should any of the three be changed (by zoom adjustment, disassembly, replacement, etc.), the combination must be recalibrated. Calibration may change if interpupillary distance is changed. Measure the field diameter, D (acceptable range: 100 ± 2 μm) with a stage micrometer upon receipt of the graticule from the manufacturer. Determine the field area (mm²).

$$\text{Field Area} = \pi(D/2)^2$$

If D=100 μm=0.1 mm, then

$$\text{Field Area} = \pi(0.1 \text{ mm}/2)^2 = 0.00785 \text{ mm}^2$$

The Graticule is available from: Graticules Ltd., Morley Road, Tonbridge TN9 1RN, Kent, England (Telephone 011-44-732-359061). Also available from PTR Optics Ltd., 145 Newton Street, Waltham, MA 02154 [telephone (617) 891-6000] or McCrone Accessories and Components, 2506 S. Michigan Ave., Chicago, IL 60616 [phone (312) 842-7100]. The graticule is custom made for each microscope.

BILLING CODE 4510-26-P

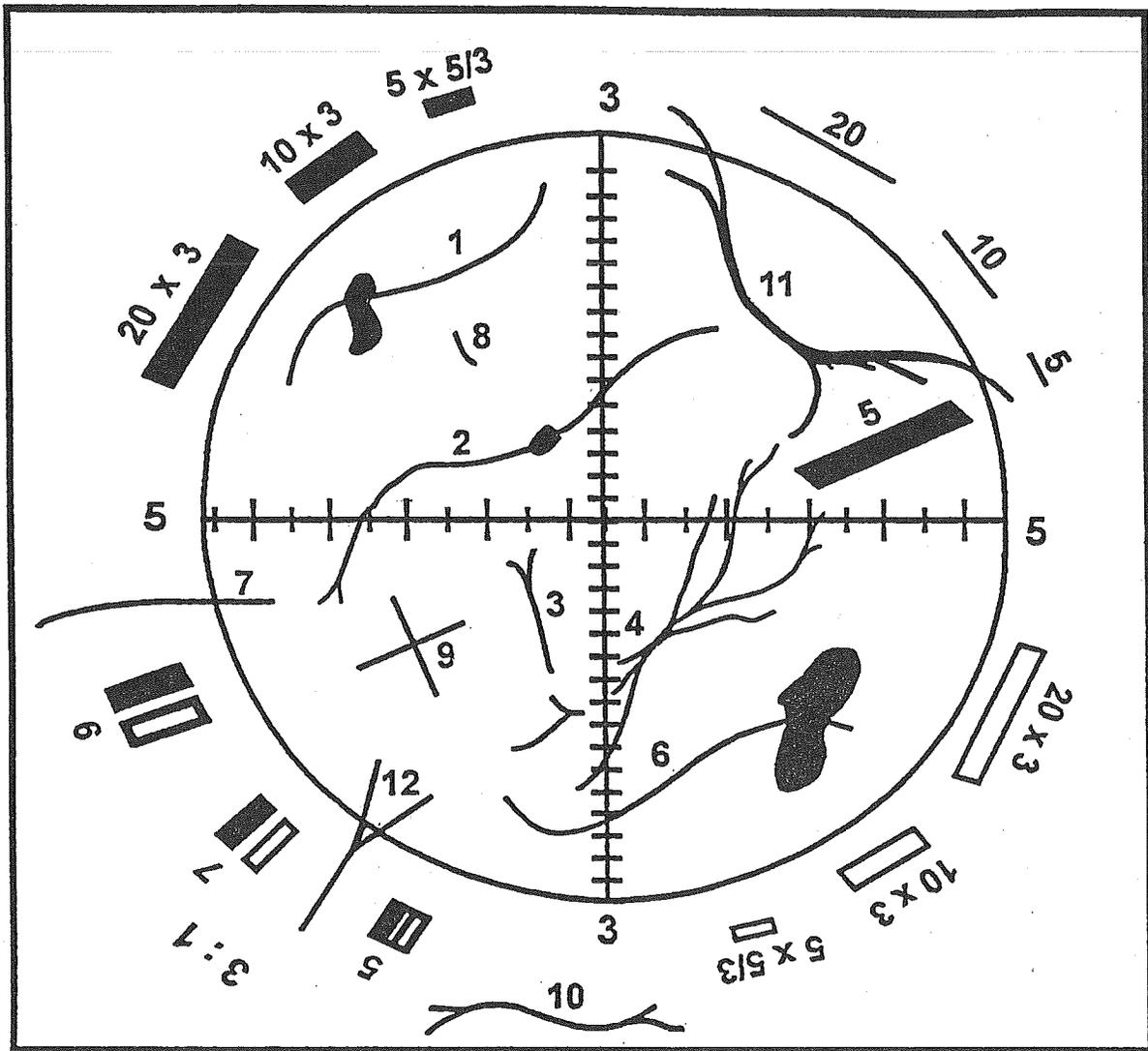


Figure 1: Walton-Beckett Graticule with some explanatory fibers.

Counts for the Fibers in the Figure

Structure No.	Count	Explanation
1 to 6	1	Single fibers all contained within the circle.
7	1/2	Fiber crosses circle once.
8	0	Fiber too short.
9	2	Two crossing fibers.
10	0	Fiber outside graticule.
11	0	Fiber crosses graticule twice.
12	1/2	Although split, fiber only crosses once.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 97-01-079, § 296-62-07737, filed 12/17/96, effective 3/1/97. Statutory Authority: Chapter 49.17 RCW. 87-24-051 (Order 87-24), § 296-62-07737, filed 11/30/87. Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-62-07737, filed 4/27/87.]

Reviser's note: The brackets and enclosed material in the text of the above section occurred in the copy filed by the agency.

WAC 296-62-07739 Appendix C—Qualitative and quantitative fit testing procedures—Mandatory. (1) Qualitative fit test protocols.

(a) Isoamyl acetate protocol.

(i) Odor threshold screening:

(A) Three one-liter glass jars with metal lids (e.g., Mason or Ball jars) are required.

(B) Odor free water (e.g., distilled or spring water) at approximately 25°C shall be used for the solutions.

(C) The isoamyl acetate (IAA) (also known as isopentyl acetate) stock solution is prepared by adding one cc of pure IAA to eight hundred cc of odor free water in a one-liter jar and shaking for thirty seconds. This solution shall be prepared new at least weekly.

(D) The screening test shall be conducted in a room separate from the room used for actual fit testing. The two rooms shall be well ventilated but shall not be connected to the same recirculating ventilation system.

(E) The odor test solution is prepared in a second jar by placing 0.4 cc of the stock solution into five hundred cc of odor free water using a clean dropper or pipette. Shake for thirty seconds and allow to stand for two to three minutes so that the IAA concentration above the liquid may reach equilibrium. This solution may be used for only one day.

(F) A test blank is prepared in a third jar by adding five hundred cc of odor free water.

(G) The odor test and test blank jars shall be labelled one and two for jar identification. If the labels are put on the lids they can be periodically peeled, dried off and switched to maintain the integrity of the test.

(H) The following instructions shall be typed on a card and placed on the table in front of the two test jars (i.e., one and two): "The purpose of this test is to determine if you can smell banana oil at a low concentration. The two bottles in front of you contain water. One of these bottles also contains a small amount of banana oil. Be sure the covers are on tight, then shake each bottle for two seconds. Unscrew the lid of each bottle, one at a time, and sniff at the mouth of the bottle. Indicate to the test conductor which bottle contains banana oil."

(I) The mixtures used in the IAA odor detection test shall be prepared in an area separate from where the test is performed, in order to prevent olfactory fatigue in the subject.

(J) If the test subject is unable to correctly identify the jar containing the odor test solution, the IAA qualitative fit test may not be used.

(K) If the test subject correctly identifies the jar containing the odor test solution, the test subject may proceed to respirator selection and fit testing.

(ii) Respirator selection.

(A) The test subject shall be allowed to pick the most comfortable respirator from a selection including respirators of various sizes from different manufacturers. The selection

shall include at least five sizes of elastomeric half facepieces, from at least two manufacturers.

(B) The selection process shall be conducted in a room separate from the fit-test chamber to prevent odor fatigue. Prior to the selection process, the test subject shall be shown how to put on a respirator, how it should be positioned on the face, how to set strap tension and how to determine a "comfortable" respirator. A mirror shall be available to assist the subject in evaluating the fit and positioning of the respirator. This instruction may not constitute the subject's formal training on respirator use, as it is only a review.

(C) The test subject should understand that the employee is being asked to select the respirator which provides the most comfortable fit. Each respirator represents a different size and shape and, if fit properly and used properly will provide adequate protection.

(D) The test subject holds each facepiece up to the face and eliminates those which obviously do not give a comfortable fit. Normally, selection will begin with a half-mask and if a good fit cannot be found, the subject will be asked to test the full facepiece respirators. (A small percentage of users will not be able to wear any half-mask.)

(E) The more comfortable facepieces are noted; the most comfortable mask is donned and worn at least five minutes to assess comfort. All donning and adjustments of the facepiece shall be performed by the test subject without assistance from the test conductor or other person. Assistance in assessing comfort can be given by discussing the points in (a)(ii)(F) of this subsection. If the test subject is not familiar with using a particular respirator, the test subject shall be directed to don the mask several times and to adjust the straps each time to become adept at setting proper tension on the straps.

(F) Assessment of comfort shall include reviewing the following points with the test subject and allowing the test subject adequate time to determine the comfort of the respirator:

(I) Positioning of mask on nose.

(II) Room for eye protection.

(III) Room to talk.

(IV) Positioning mask on face and cheeks.

(G) The following criteria shall be used to help determine the adequacy of the respirator fit:

(I) Chin properly placed.

(II) Strap tension.

(III) Fit across nose bridge.

(IV) Distance from nose to chin.

(V) Tendency to slip.

(VI) Self-observation in mirror.

(H) The test subject shall conduct the conventional negative and positive-pressure fit checks before conducting the negative- or positive-pressure test the subject shall be told to "seat" the mask by rapidly moving the head from side-to-side and up and down, while taking a few deep breaths.

(I) The test subject is now ready for fit testing.

(J) After passing the fit test, the test subject shall be questioned again regarding the comfort of the respirator. If it has become uncomfortable, another model of respirator shall be tried.

(K) The employee shall be given the opportunity to select a different facepiece and be retested if the chosen facepiece becomes increasingly uncomfortable at any time.

(iii) Fit test.

(A) The fit test chamber shall be similar to a clear fifty-five gallon drum liner suspended inverted over a two-foot diameter frame, so that the top of the chamber is about six inches above the test subject's head. The inside top center of the chamber shall have a small hook attached.

(B) Each respirator used for the fitting and fit testing shall be equipped with organic vapor cartridges or offer protection against organic vapors. The cartridges or masks shall be changed at least weekly.

(C) After selecting, donning, and properly adjusting a respirator, the test subject shall wear it to the fit testing room. This room shall be separate from the room used for odor threshold screening and respirator selection, and shall be well ventilated, as by an exhaust fan or lab hood, to prevent general room contamination.

(D) A copy of the following test exercises and "rainbow passage" shall be taped to the inside of the test chamber:

Test exercises.

(I) Breathe normally.

(II) Breathe deeply. Be certain breaths are deep and regular.

(III) Turn head all the way from one side to the other. Inhale on each side. Be certain movement is complete. Do not bump the respirator against the shoulders.

(IV) Nod head up and down. Inhale when head is in the full up position (looking toward ceiling). Be certain motions are complete and made about every second. Do not bump the respirator on the chest.

(V) Talking. Talk aloud and slowly for several minutes. The following paragraph is called the "rainbow passage." Reading it will result in a wide range of facial movements, and thus be useful to satisfy this requirement. Alternative passages which serve the same purpose may also be used.

(VI) Jogging in place.

(VII) Breathe normally.

"Rainbow Passage."

When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond reach, his friends say he is looking for the pot of gold at the end of the rainbow.

(E) Each test subject shall wear the respirator for at least ten minutes before starting the fit test.

(F) Upon entering the test chamber, the test subject shall be given a six-inch by five-inch piece of paper towel or other porous absorbent single ply material, folded in half and wetted with three-quarters of one cc of pure IAA. The test subject shall hang the wet towel on the hook at the top of the chamber.

(G) Allow two minutes for the IAA test concentration to be reached before starting the fit-test exercises. This would be an appropriate time to talk with the test subject, to explain the fit test, the importance of cooperation, the

purpose for the head exercises, or to demonstrate some of the exercises.

(H) Each exercise described in (D) of this subsection shall be performed for at least one minute.

(I) If at any time during the test, the subject detects the banana-like odor of IAA, the test has failed. The subject shall quickly exit from the test chamber and leave the test area to avoid olfactory fatigue.

(J) If the test is failed, the subject shall return to the selection room and remove the respirator, repeat the odor sensitivity test, select and put on another respirator, return to the test chamber, and again begin the procedure described in (b)(iii)(D) through (H) of this subsection. The process continues until a respirator that fits well has been found. Should the odor sensitivity test be failed, the subject shall wait about five minutes before retesting. Odor sensitivity will usually have returned by this time.

(K) If a person cannot pass the fit test described above wearing a half-mask respirator from the available selection, full facepiece models must be used.

(L) When a respirator is found that passes the test, the subject breaks the face seal and takes a breath before exiting the chamber. This is to assure that the reason the test subject is not smelling the IAA is the good fit of the respirator facepiece seal and not olfactory fatigue.

(M) When the test subject leaves the chamber, the subject shall remove the saturated towel and return it to the person conducting the test. To keep the area from becoming contaminated, the used towels shall be kept in a self-sealing bag so there is no significant IAA concentration buildup in the test chamber during subsequent tests.

(N) At least two facepieces shall be selected for the IAA test protocol. The test subject shall be given the opportunity to wear them for one week to choose the one which is more comfortable to wear.

(O) Persons who have successfully passed this fit test with a half-mask respirator may be assigned the use of the test respirator in atmospheres with up to 2 f/cc of airborne asbestos.

(P) The test shall not be conducted if there is any hair growth between the skin and the facepiece sealing surface.

(Q) If hair growth or apparel interfere with a satisfactory fit, then they shall be altered or removed so as to eliminate interference and allow a satisfactory fit. If a satisfactory fit is still not attained, the test subject must use a positive-pressure respirator such as powered air-purifying respirators, supplied-air respirator, or self-contained breathing apparatus.

(R) If a test subject exhibits difficulty in breathing during the tests, she or he shall be referred to a physician trained in respirator diseases or pulmonary medicine to determine whether the test subject can wear a respirator while performing her or his duties.

(S) Qualitative fit testing shall be repeated at least every six months.

(T) In addition, because the sealing of the respirator may be affected, qualitative fit testing shall be repeated immediately when the test subject has a:

(I) Weight change of twenty pounds or more,

(II) Significant facial scarring in the area of the facepiece seal,

(III) Significant dental changes; i.e., multiple extractions without prosthesis, or acquiring dentures,

(IV) Reconstructive or cosmetic surgery, or

(V) Any other condition that may interfere with face-piece sealing.

(iv) Recordkeeping.

A summary of all test results shall be maintained in each office for three years. The summary shall include:

(A) Name of test subject.

(B) Date of testing.

(C) Name of the test conductor.

(D) Respirators selected (indicate manufacturer, model, size and approval number).

(E) Testing agent.

(b) Saccharin solution aerosol protocol.

(i) Respirator selection. Respirators shall be selected as described in (a)(ii) of this subsection (respirator selection), except that each respirator shall be equipped with a particulate filter.

(ii) Taste threshold screening.

(A) An enclosure about head and shoulders shall be used for threshold screening (to determine if the individual can taste saccharin) and for fit testing. The enclosure shall be approximately twelve inches in diameter by fourteen inches tall with at least the front clear to allow free movement of the head when a respirator is worn.

(B) The test enclosure shall have a three-quarter inch hole in front of the test subject's nose and mouth area to accommodate the nebulizer nozzle.

(C) The entire screening and testing procedure shall be explained to the test subject prior to conducting the screening test.

(D) During the threshold screening test, the test subject shall don the test enclosure and breathe with open mouth with tongue extended.

(E) Using a DeVilbiss Model 40 Inhalation Medication Nebulizer or equivalent, the test conductor shall spray the threshold check solution into the enclosure. This nebulizer shall be clearly marked to distinguish it from the fit test solution nebulizer.

(F) The threshold check solution consists of 0.83 grams of sodium saccharin USP in 100 cc of warm water. It can be prepared by putting 1 cc of the test solution (see (b)(iii)(G) of this subsection) in one hundred cc of water.

(G) To produce the aerosol, the nebulizer bulb is firmly squeezed so that it collapses completely, then is released and allowed to fully expand.

(H) Ten squeezes of the nebulizer bulb are repeated rapidly and then the test subject is asked whether the saccharin can be tasted.

(I) If the first response is negative, ten more squeezes of the nebulizer bulb are repeated rapidly and the test subject is again asked whether the saccharin can be tasted.

(J) If the second response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the saccharin can be tasted.

(K) The test conductor will take note of the number of squeezes required to elicit a taste response.

(L) If the saccharin is not tasted after thirty squeezes ((b)(ii)(J) of this subsection), the saccharin fit test cannot be performed on the test subject.

(M) If a taste response is elicited, the test subject shall be asked to take note of the taste for reference in the fit test.

(N) Correct use of the nebulizer means that approximately 1 cc of liquid is used at a time in the nebulizer body.

(O) The nebulizer shall be thoroughly rinsed in water, shaken dry, and refilled at least every four hours.

(iii) Fit test.

(A) The test subject shall don and adjust the respirator without the assistance from any person.

(B) The fit test uses the same enclosure described in (b)(ii) of this subsection.

(C) Each test subject shall wear the respirator for at least ten minutes before starting the fit test.

(D) The test subject shall don the enclosure while wearing the respirator selected in (a)(ii) of this subsection. This respirator shall be properly adjusted and equipped with a particulate filter.

(E) The test subject may not eat, drink, (except plain water), or chew gum for fifteen minutes before the test.

(F) A second DeVilbiss Model 40 Inhalation Medication Nebulizer is used to spray the fit test solution into the enclosure. This nebulizer shall be clearly marked to distinguish it from the screening test solution nebulizer.

(G) The fit test solution is prepared by adding eighty-three grams of sodium saccharin to one hundred cc of warm water.

(H) As before, the test subject shall breathe with mouth open and tongue extended.

(I) The nebulizer is inserted into the hole in the front of the enclosure and the fit test solution is sprayed into the enclosure using the same technique as for the taste threshold screening and the same number of squeezes required to elicit a taste response in the screening. (See (b)(ii)(H) through (J) of this subsection.)

(J) After generation of the aerosol read the following instructions to the test subject. The test subject shall perform the exercises for one minute each.

(I) Breathe normally.

(II) Breathe deeply. Be certain breaths are deep and regular.

(III) Turn head all the way from one side to the other. Be certain movement is complete. Inhale on each side. Do not bump the respirator against the shoulders.

(IV) Nod head up and down. Be certain motions are complete. Inhale when head is in the full up position (when looking toward the ceiling). Do not bump the respirator on the chest.

(V) Talking. Talk aloud and slowly for several minutes. The following paragraph is called the "rainbow passage." Reading it will result in a wide range of facial movements, and thus be useful to satisfy this requirement. Alternative passages which serve the same purpose may also be used.

(VI) Jogging in place.

(VII) Breathe normally.

"Rainbow Passage."

When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but

no one ever finds it. When a man looks for something beyond his reach, his friends say he is looking for the pot of gold at the end of the rainbow.

(K) At the beginning of each exercise, the aerosol concentration shall be replenished using one-half the number of squeezes as initially described in (b)(iii)(I) of this subsection.

(L) The test subject shall indicate to the test conductor if at any time during the fit test the taste of saccharin is detected.

(M) If the saccharin is detected the fit is deemed unsatisfactory and a different respirator shall be tried.

(N) At least two facepieces shall be selected by the saccharin test protocol. The test subject shall be given the opportunity to wear them for one week to choose the one which is more comfortable to wear.

(O) Successful completion of the test protocol shall allow the use of the half mask tested respirator in contaminated atmospheres up to 2 f/cc of asbestos. In other words this protocol may be used to assign protection factors no higher than ten.

(P) The test shall not be conducted if there is any hair growth between the skin and the facepiece sealing surface.

(Q) If hair growth or apparel interfere with a satisfactory fit, then they shall be altered or removed so as to eliminate interference and allow a satisfactory fit. If a satisfactory fit is still not attained, the test subject must use a positive-pressure respirator such as powered air-purifying respirators, supplied-air respirator, or self-contained breathing apparatus.

(R) If a test subject exhibits difficulty in breathing during the tests, she or he shall be referred to a physician trained in respirator diseases or pulmonary medicine to determine whether the test subject can wear a respirator while performing her or his duties.

(S) Qualitative fit testing shall be repeated at least every six months.

(T) In addition, because the sealing of the respirator may be affected, qualitative fit testing shall be repeated immediately when the test subject has a:

(I) Weight change of twenty pounds or more,

(II) Significant facial scarring in the area of the facepiece seal,

(III) Significant dental changes; i.e., multiple extractions without prosthesis, or acquiring dentures,

(IV) Reconstructive or cosmetic surgery, or

(V) Any other condition that may interfere with facepiece sealing.

(iv) Recordkeeping.

A summary of all test results shall be maintained in each office for three years. The summary shall include:

(A) Name of test subject.

(B) Date of testing.

(C) Name of test conductor.

(D) Respirators selected (indicate manufacturer, model, size and approval number).

(E) Testing agent.

(c) Irritant fume protocol.

(i) Respirator selection.

Respirators shall be selected as described in (a)(ii) of this subsection, except that each respirator shall be equipped with a high-efficiency cartridge.

(ii) Fit test.

(A) The test subject shall be allowed to smell a weak concentration of the irritant smoke to familiarize the subject with the characteristic odor.

(B) The test subject shall properly don the respirator selected as above, and wear it for at least ten minutes before starting the fit test.

(C) The test conductor shall review this protocol with the test subject before testing.

(D) The test subject shall perform the conventional positive pressure and negative pressure fit checks (see ANSI Z88.2 1980). Failure of either check shall be cause to select an alternate respirator.

(E) Break both ends of a ventilation smoke tube containing stannic oxychloride, such as the MSA part #5645, or equivalent. Attach a short length of tubing to one end of the smoke tube. Attach the other end of the smoke tube to a low pressure air pump set to deliver two hundred milliliters per minute.

(F) Advise the test subject that the smoke can be irritating to the eyes and instruct the subject to keep the eyes closed while the test is performed.

(G) The test conductor shall direct the stream of irritant smoke from the tube towards the facepiece area of the test subject. The person conducting the test shall begin with the tube at least twelve inches from the facepiece and gradually move to within one inch, moving around the whole perimeter of the mask.

(H) The test subject shall be instructed to do the following exercises while the respirator is being challenged by the smoke. Each exercise shall be performed for one minute.

(I) Breathe normally.

(II) Breathe deeply. Be certain breaths are deep and regular.

(III) Turn head all the way from one side to the other. Be certain movement is complete. Inhale on each side. Do not bump the respirator against the shoulders.

(IV) Nod head up and down. Be certain motions are complete and made every second. Inhale when head is in the full up position (looking toward ceiling). Do not bump the respirator against the chest.

(V) Talking. Talk aloud and slowly for several minutes. The following paragraph is called the "rainbow passage." Repeating it after the test conductor (keeping eyes closed) will result in a wide range of facial movements, and thus be useful to satisfy this requirement. Alternative passages which serve the same purpose may also be used.

"Rainbow Passage."

When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond his reach, his friends say he is looking for the pot of gold at the end of the rainbow.

(VI) Jogging in place.

(VII) Breathe normally.

(I) The test subject shall indicate to the test conductor if the irritant smoke is detected. If smoke is detected, the test conductor shall stop the test. In this case, the tested respirator is rejected and another respirator shall be selected.

(J) Each test subject passing the smoke test (i.e., without detecting the smoke) shall be given a sensitivity check of smoke from the same tube to determine if the test subject reacts to the smoke. Failure to evoke a response shall void the fit test.

(K) This fit test protocol, (c)(ii)(D), (I), and (J) of this subsection, shall be performed in a location with exhaust ventilation sufficient to prevent general contamination of the testing area by the test agents.

(L) At least two facepieces shall be selected by the irritant fume test protocol. The test subject shall be given the opportunity to wear them for one week to choose the one which is more comfortable to wear.

(M) Respirators successfully tested by the protocol may be used in contaminated atmospheres up to 2 f/cc of asbestos.

(N) The test shall not be conducted if there is any hair growth between the skin and the facepiece sealing surface.

(O) If hair growth or apparel interfere with a satisfactory fit, then they shall be altered or removed so as to eliminate interference and allow a satisfactory fit. If a satisfactory fit is still not attained, the test subject must use a positive-pressure respirator such as powered air-purifying respirators, supplied-air respirator, or self-contained breathing apparatus.

(P) If a test subject exhibits difficulty in breathing during the tests, she or he shall be referred to a physician trained in respirator diseases or pulmonary medicine to determine whether the test subject can wear a respirator while performing her or his duties.

(Q) Qualitative fit testing shall be repeated at least every six months.

(R) In addition, because the sealing of the respirator may be affected, qualitative fit testing shall be repeated immediately when the test subject has a:

(I) Weight change of twenty pounds or more,

(II) Significant facial scarring in the area of the facepiece seal,

(III) Significant dental changes; i.e., multiple extractions without prosthesis, or acquiring dentures,

(IV) Reconstructive or cosmetic surgery, or

(V) Any other condition that may interfere with facepiece sealing.

(iii) Recordkeeping.

A summary of all test results shall be maintained in each office for three years. The summary shall include:

(A) Name of test subject.

(B) Date of testing.

(C) Name of test conductor.

(D) Respirators selected (indicate manufacturer, model, size and approval number).

(E) Testing agent.

(2) Quantitative fit test procedures.

(a) General.

(i) The method applies to the negative-pressure nonpowered air-purifying respirators only.

(ii) The employer shall assign one individual who shall assume the full responsibility for implementing the respirator quantitative fit test program.

(b) Definition.

(i) "Quantitative fit test" means the measurement of the effectiveness of a respirator seal in excluding the ambient atmosphere. The test is performed by dividing the measured concentration of challenge agent in a test chamber by the measured concentration of the challenge agent inside the respirator facepiece when the normal air-purifying element has been replaced by an essentially perfect purifying element.

(ii) "Challenge agent" means the air contaminant introduced into a test chamber so that its concentration inside and outside the respirator may be compared.

(iii) "Test subject" means the person wearing the respirator for quantitative fit testing.

(iv) "Normal standing position" means standing erect and straight with arms down along the sides and looking straight ahead.

(v) "Fit factor" means the ratio of challenge agent concentration outside with respect to the inside of a respirator inlet covering (facepiece or enclosure).

(c) Apparatus.

(i) Instrumentation. Corn oil, sodium chloride or other appropriate aerosol generation, dilution, and measurement systems shall be used for quantitative fit test.

(ii) Test chamber. The test chamber shall be large enough to permit all test subjects to freely perform all required exercises without distributing the challenge agent concentration or the measurement apparatus. The test chamber shall be equipped and constructed so that the challenge agent is effectively isolated from the ambient air yet uniform in concentration throughout the chamber.

(iii) When testing air-purifying respirators, the respirator shall be equipped with a cartridge or canister approved for removal of the test agent, or with a high efficiency particulate filter. Only approved assemblies shall be tested.

(iv) The sampling instrument shall be selected so that a strip chart record may be made of the test showing the rise and fall of challenge agent concentration with each inspiration and expiration at fit factors of at least two thousand.

(v) The combination of substitute air-purifying elements (if any), challenge agent, and challenge agent concentration in the test chamber shall be such that the test subject is not exposed in excess of PEL to the challenge agent at any time during the testing process.

(vi) The sampling port on the test specimen respirator shall be placed and constructed so that there is no detectable leak around the port, a free air flow is allowed into the sampling line at all times and so there is no interference with the fit or performance of the respirator.

(vii) The test chamber and test set-up shall permit the person administering the test to observe one test subject inside the chamber during the test.

(viii) The equipment generating the challenge atmosphere shall maintain the concentration of challenge agent constant within a ten percent variation for the duration of the test.

(ix) The time lag (interval between an event and its being recorded on the strip chart) of the instrumentation may not exceed two seconds.

(x) The tubing for the test chamber atmosphere and for the respirator sampling port shall be the same diameter, length and material. It shall be kept as short as possible. The smallest diameter tubing recommended by the manufacturer shall be used.

(xi) The exhaust flow from the test chamber shall pass through a high-efficiency filter before release to the room.

(xii) When sodium chloride aerosol is used, the relative humidity inside the test chamber shall not exceed fifty percent.

(d) Procedural requirements.

(i) The fitting of half-mask respirators should be started with those having multiple sizes and a variety of interchangeable cartridges and canisters such as the MSA Comfo II-M, North M, Survivair M, A-O M, or Scott-M. Use either of the tests outlined below to assure that the facepiece is properly adjusted.

(A) Positive pressure test. With the exhaust port(s) blocked, the negative pressure of slight inhalation should remain constant for several seconds.

(B) Negative pressure test. With the intake port(s) blocked, the negative pressure slight inhalation should remain constant for several seconds.

(ii) After a facepiece is adjusted, the test subject shall wear the facepiece for at least five minutes before conducting a qualitative test by using either of the methods described below and using the exercise regime described in (e)(i) through (v) of this subsection.

(A) Isoamyl acetate test. When using organic vapor cartridges, the test subject who can smell the odor should be unable to detect the odor of isoamyl acetate squirted into the air near the most vulnerable portions of the facepiece seal. In a location which is separated from the test area, the test subject shall be instructed to close her/his eyes during the test period. A combination cartridge or canister with organic vapor and high-efficiency filters shall be used when available for the particular mask being tested. The test subject shall be given an opportunity to smell the odor of isoamyl acetate before the test is conducted.

(B) Irritant fume test. When using high-efficiency filters, the test subject should be unable to detect the odor of irritant fume (stannic chloride or titanium tetrachloride ventilation smoke tubes) squirted into the air near the most vulnerable portions of the facepiece seal. The test subject shall be instructed to close her/his eyes during the test period.

(iii) The test subject may enter the quantitative testing chamber only if she or he has obtained a satisfactory fit as stated in (d)(ii) of this subsection.

(iv) Before the subject enters the test chamber, a reasonably stable challenge agent concentration shall be measured in the test chamber.

(v) Immediately after the subject enters the test chamber, the challenge agent concentration inside the respirator shall be measured to ensure that the peak penetration does not exceed five percent for a half-mask and one percent for a full facepiece.

(vi) A stable challenge agent concentration shall be obtained prior to the actual start of testing.

(A) Respirator restraining straps may not be overtightened for testing. The straps shall be adjusted by the wearer to give a reasonably comfortable fit typical of normal use.

(e) Exercise regime. Prior to entering the test chamber, the test subject shall be given complete instructions as to her/his part in the test procedures. The test subject shall perform the following exercises, in the order given, for each independent test.

(i) Normal breathing (NB). In the normal standing position, without talking, the subject shall breathe normally for at least one minute.

(ii) Deep breathing (DB). In the normal standing position the subject shall do deep breathing for at least one minute pausing so as not to hyperventilate.

(iii) Turning head side to side (SS). Standing in place the subject shall slowly turn his/her head from side between the extreme positions to each side. The head shall be held at each extreme position for at least five seconds. Perform for at least three complete cycles.

(iv) Moving head up and down (UD). Standing in place, the subject shall slowly move his/her head up and down between the extreme position straight up and the extreme position straight down. The head shall be held at each extreme position for at least five seconds. Perform for at least three complete cycles.

(v) Reading (R). The test subject (keeping eyes closed) shall repeat after the test conductor the "rainbow passage" at the end of this section. The subject shall talk slowly and aloud so as to be heard clearly by the test conductor or monitor. The test subject shall read the "rainbow passage" at the end of this section.

(vi) Grimace (G). The test subject shall grimace, smile, frown, and generally contort the face using the facial muscles. Continue for at least fifteen seconds.

(vii) Bend over and touch toes (B). The test subject shall bend at the waist and touch toes and return to upright position. Repeat for at least thirty seconds.

(viii) Jogging in place (J). The test subject shall perform jog in place for at least thirty seconds.

(ix) Normal breathing (NB). Same as exercise (e)(i) of this subsection.

"Rainbow Passage."

When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond reach, his friends say he is looking for the pot of gold at the end of the rainbow.

(f) The test shall be terminated whenever any single peak penetration exceeds five percent for half-masks and one percent for full facepieces. The test subject may be refitted and retested. If two of the three required tests are terminated, the fit shall be deemed inadequate.

(g) Calculation of fit factors.

(i) The fit factor is determined by dividing the average challenge agent concentration in the test chamber by the average challenge agent concentration inside the respirator facepiece for the test exercise.

IF YES TO 17A:

- B. Have you ever worked for a year or more in any dusty job? 1. Yes ... 2. No ... 3. Does not apply ...

Specify job/industry ... Total years worked ... Was dust exposure: 1. Mild ... 2. Moderate ... 3. Severe ...

- C. Have you ever been exposed to gas or chemical fumes in your work? 1. Yes ... 2. No ...

Specify job/industry ... Total years worked ... Was exposure: 1. Mild ... 2. Moderate ... 3. Severe ...

- D. What has been your usual occupation or job—the one you have worked at the longest? 1. Job occupation ... 2. Number of years employed in this occupation ... 3. Position/job title ... 4. Business, field or industry ...

(Record on lines the years in which you have worked in any of these industries, e.g., 1960-1969.)

Have you ever worked:

- E. In a mine? F. In a quarry? G. In a foundry? H. In a pottery? I. In a cotton, flax or hemp mill? J. With asbestos? YES NO

18. PAST MEDICAL HISTORY

- A. Do you consider yourself to be in good health? B. Have you any defect in vision? C. Have you any hearing defect? D. Are you suffering from or have you ever suffered from: a. Epilepsy ... b. Rheumatic fever? c. Kidney disease? d. Bladder disease? e. Diabetes? f. Jaundice? YES NO

19. CHEST COLDS AND CHEST ILLNESSES

- 19A. If you get a cold, does it usually go to your chest? (Usually means more than 1/2 the time.) 1. Yes ... 2. No ... 3. Don't get colds ...

- 20A. During the past 3 years, have you had any chest illnesses that have kept you off work, indoors at home, or in bed? 1. Yes ... 2. No ...

IF YES TO 20A:

- B. Did you produce phlegm with any of these chest illnesses? 1. Yes ... 2. No ... 3. Does not apply ...

- C. In the last 3 years, how many such illnesses with (increased) phlegm did you have which lasted a week or more? Number of illnesses ... No such illnesses ...

- 21. Did you have any lung trouble before the age of 16? 1. Yes ... 2. No ...

- 22. Have you ever had any of the following?

- 1A. Attacks of bronchitis? 1. Yes ... 2. No ...

IF YES TO 1A:

- B. Was it confirmed by a doctor? 1. Yes ... 2. No ... 3. Does not apply ...

- C. At what age was your first attack? Age in years ... Does not apply ...

- 2A. Pneumonia? (include broncho-pneumonia) 1. Yes ... 2. No ...

IF YES TO 2A:

- B. Was it confirmed by a doctor? 1. Yes ... 2. No ... 3. Does not apply ...

- C. At what age did you first have it? Age in years ... Does not apply ...

- 3A. Hay fever? 1. Yes ... 2. No ...

IF YES TO 3A:

- B. Was it confirmed by a doctor? 1. Yes ... 2. No ... 3. Does not apply ...

- C. At what age did it start? Age in years ... Does not apply ...

- 23A. Have you ever had chronic bronchitis? 1. Yes ... 2. No ...

IF YES TO 23A:

- B. Do you still have it? 1. Yes ... 2. No ... 3. Does not apply ...

- C. Was it confirmed by a doctor? 1. Yes ... 2. No ... 3. Does not apply ...

- D. At what age did it start? Age in years ... Does not apply ...

- 24A. Have you ever had emphysema? 1. Yes ... 2. No ...

IF YES TO 24A:

- B. Do you still have it? 1. Yes ... 2. No ... 3. Does not apply ...

- C. Was it confirmed by a doctor? 1. Yes ... 2. No ... 3. Does not apply ...

- D. At what age did it start? Age in years ... Does not apply ...

- 25A. Have you ever had asthma? 1. Yes ... 2. No ...

IF YES TO 25A:

- B. Do you still have it? 1. Yes ... 2. No ... 3. Does not apply ...

- C. Was it confirmed by a doctor? 1. Yes ... 2. No ... 3. Does not apply ...

- D. At what age did it start? Age in years ... Does not apply ...

- E. If you no longer have it, at what age did it stop? Age stopped ... Does not apply ...

- 26. Have you ever had:

- A. Any other chest illness? 1. Yes ... 2. No ...

If yes, please specify

- B. Any chest operations? 1. Yes ... 2. No ...

If yes, please specify

- C. Any chest injuries? 1. Yes ... 2. No ...

If yes, please specify

- 27A. Has a doctor ever told you that you had heart trouble? 1. Yes ... 2. No ...

IF YES TO 27A:

- B. Have you ever had treatment for heart trouble in the past 10 years? 1. Yes ... 2. No ... 3. Does not apply ...

- 28A. Has a doctor ever told you that you had high blood pressure? 1. Yes ... 2. No ...

IF YES TO 28A:

- B. Have you had any treatment for high blood pressure (hypertension) in the past 10 years? 1. Yes ... 2. No ... 3. Does not apply ...

- 29. When did you last have your chest x-rayed? (Year) ...

25 26 27 28

30. Where did you last have your chest x-rayed (if known)?
 What was the outcome?

FAMILY HISTORY

31. Were either of your natural parents ever told by a doctor that they had a chronic lung condition such as:

	FATHER			MOTHER		
	1. Yes	2. No	3. Don't Know	1. Yes	2. No	3. Don't Know
A. Chronic Bronchitis?
B. Emphysema?
C. Asthma?
D. Lung cancer?
E. Other chest conditions?
F. Is parent currently alive?
G. Please specify	...	Age if living ... Age at death ... Don't know	...	Age if living ... Age at death ... Don't know	...	...
H. Please specify cause of death					

COUGH

- 32A. Do you usually have a cough? (Count a cough with first smoke or on first going out of doors. Exclude clearing of throat.) (If no, skip to question 32C.) 1. Yes ... 2. No ...
- B. Do you usually cough as much as 4 to 6 times a day 4 or more days out of the week? 1. Yes ... 2. No ...
- C. Do you usually cough at all on getting up or first thing in the morning? 1. Yes ... 2. No ...
- D. Do you usually cough at all during the rest of the day or at night? 1. Yes ... 2. No ...

IF YES TO ANY OF ABOVE (32A, B, C, OR D), ANSWER THE FOLLOWING. IF NO TO ALL, CHECK DOES NOT APPLY AND SKIP TO NEXT PAGE

- E. Do you usually cough like this on most days for 3 consecutive months or more during the year? 1. Yes ... 2. No ... 3. Does not apply ...
- F. For how many years have you had the cough? Number of years ... Does not apply ...
- 33A. Do you usually bring up phlegm from your chest? (Count phlegm with the first smoke or on first going out of doors. Exclude phlegm from the nose. Count swallowed phlegm.) (If no, skip to 33C.) 1. Yes ... 2. No ...
- B. Do you usually bring up phlegm like this as much as twice a day 4 or more days out of the week? 1. Yes ... 2. No ...
- C. Do you usually bring up phlegm at all on getting up or first thing in the morning? 1. Yes ... 2. No ...
- D. Do you usually bring up phlegm at all during the rest of the day or at night? 1. Yes ... 2. No ...

IF YES TO ANY OF THE ABOVE (33A, B, C, OR D), ANSWER THE FOLLOWING: IF NO TO ALL, CHECK DOES NOT APPLY AND SKIP TO 34A.

- E. Do you bring up phlegm like this on most days for 3 consecutive months or more during the year? 1. Yes ... 2. No ... 3. Does not apply ...
- F. For how many years have you had trouble with phlegm? Number of years ... Does not apply ...

EPISODES OF COUGH AND PHLEGM

34A. Have you had periods or episodes of (increased*) cough and phlegm lasting for 3 weeks or more each year? 1. Yes ... 2. No ...
 *(For persons who usually have cough and/or phlegm.)

IF YES TO 34A:

B. For how long have you had at least 1 such episode per year? Number of years ... Does not apply ...

WHEEZING

35A. Does your chest ever sound wheezy or whistling:
 1. When you have a cold? 1. Yes ... 2. No ...
 2. Occasionally apart from colds? 1. Yes ... 2. No ...
 3. Most days or nights? 1. Yes ... 2. No ...

IF YES TO 1, 2, OR 3 IN 35A:

B. For how many years has this been present? Number of years ... Does not apply ...

36A. Have you ever had an attack of wheezing that has made you feel short of breath? 1. Yes ... 2. No ...

IF YES TO 36A:

B. How old were you when you had your first such attack? Age in years ... Does not apply ...

C. Have you had 2 or more such episodes? 1. Yes ... 2. No ... 3. Does not apply ...

D. Have you ever required medicine or treatment for the(se) attack(s)? 1. Yes ... 2. No ... 3. Does not apply ...

BREATHLESSNESS

37. If disabled from walking by any condition other than heart or lung disease, please describe and proceed to question 39A. Nature of condition(s)

38A. Are you troubled by shortness of breath when hurrying on the level or walking up a slight hill? 1. Yes ... 2. No ...

IF YES TO 38A:

B. Do you have to walk slower than people of your age on the level because of breathlessness? 1. Yes ... 2. No ... 3. Does not apply ...

C. Do you ever have to stop for breath when walking at your own pace on the level? 1. Yes ... 2. No ... 3. Does not apply ...

D. Do you ever have to stop for breath after walking about 100 yards (or after a few minutes) on the level? 1. Yes ... 2. No ... 3. Does not apply ...

E. Are you too breathless to leave the house or breathless on dressing or climbing one flight of stairs? 1. Yes ... 2. No ... 3. Does not apply ...

TOBACCO SMOKING

39A. Have you ever smoked cigarettes? (No means less than 20 packs of cigarettes or 12 oz. of tobacco in a lifetime or less than 1 cigarette a day for 1 year.) 1. Yes ... 2. No ...

IF YES TO 39A:

B. Do you now smoke cigarettes (as of one month ago)? 1. Yes ... 2. No ... 3. Does not apply ...

C. How old were you when you first started regular cigarette smoking? Age in years ... Does not apply ...

D. If you have stopped smoking cigarettes completely, how old were you when you stopped? Aged stopped ... Check if still smoking ... Does not apply ...

E. How many cigarettes do you smoke per day now? Cigarettes per day ... Does not apply ...

- F. On the average of the entire time you smoked, how many cigarettes did you smoke per day? Cigarettes per day . . . Does not apply . . .
- G. Do you or did you inhale the cigarette smoke? 1. Does not apply . . . 2. Not at all . . . 3. Slightly . . . 4. Moderately . . . 5. Deeply . . .
- 40A. Have you ever smoked a pipe regularly? (Yes means more than 12 ounces of tobacco in a lifetime.) 1. Yes . . . 2. No . . .

IF YES TO 40A:

FOR PERSONS WHO HAVE EVER SMOKED A PIPE

- B. 1. How old were you when you started to smoke a pipe regularly? Age
- 2. If you have stopped smoking a pipe completely, how old were you when you stopped? Age stopped Check if still smoking pipe Does not apply
- C. On the average over the entire time you smoked a pipe, how much pipe tobacco did you smoke per week? . . . oz. per week (a standard pouch of tobacco contains 1-1/2 ounces) . . . Does not apply
- D. How much pipe tobacco are you smoking now? oz. per week Not currently smoking a pipe
- E. Do you or did you inhale the pipe smoke? 1. Never smoked 2. Not at all 3. Slightly 4. Moderately 5. Deeply

- 41A. Have you ever smoked cigars regularly? (Yes means more than 1 cigar a week for a year.) 1. Yes 2. No

IF YES TO 41A:

FOR PERSONS WHO HAVE EVER SMOKED CIGARS

- B. 1. How old were you when you started smoking cigars regularly? Age
- 2. If you have stopped smoking cigars completely, how old were you when you stopped? Age stopped Check if still smoking cigars Does not apply
- C. On the average over the entire time you smoked cigars, how many cigars did you smoke per week? Cigars per week Does not apply
- D. How many cigars are you smoking per week now? Cigars per week Check if not smoking cigars currently
- E. Do you or did you inhale the cigar smoke? 1. Never smoked 2. Not at all 3. Slightly 4. Moderately 5. Deeply

Signature Date

Part 2 PERIODIC MEDICAL QUESTIONNAIRE

- 1. NAME
- 2. SOCIAL SECURITY # 1 2 3 4 5 6 7 8 9
- 3. CLOCK NUMBER 10 11 12 13 14 15
- 4. PRESENT OCCUPATION
- 5. PLANT

6. ADDRESS
7. (Zip Code)

8. TELEPHONE NUMBER
9. INTERVIEWER
10. DATE 16 17 18 19 20 21

- 11. What is your marital status? 1. Single 4. Separated/ Divorced 2. Married 3. Widowed

12. OCCUPATIONAL HISTORY

- 12A. In the past year, did you work full time (30 hours per week or more) for 6 months or more? 1. Yes 2. No

IF YES TO 12A:

- 12B. In the past year, did you work in a dusty job? 1. Yes 2. No 3. Does not apply

- 12C. Was dust exposure: 1. Mild 2. Moderate 3. Severe

- 12D. In the past year, were you exposed to gas or chemical fumes in your work? 1. Yes 2. No

- 12E. Was exposure: 1. Mild 2. Moderate 3. Severe

- 12F. In the past year, what was your: 1. Job/occupation? 2. Position/job title?

13. RECENT MEDICAL HISTORY

- 13A. Do you consider yourself to be in good health? Yes No
- If NO, state reason

- 13B. In the past year, have you developed: Yes No
- Epilepsy?
- Rheumatic fever?
- Kidney disease?
- Bladder disease?
- Diabetes?
- Jaundice?
- Cancer?

14. CHEST COLDS AND CHEST ILLNESS

- 14A. If you get a cold, does it usually go to your chest? (Usually means more than 1/2 the time.) 1. Yes 2. No 3. Don't get colds

- 15A. During the past year, have you had any chest illnesses that have kept you off work, indoors at home, or in bed? 1. Yes 2. No 3. Does not apply

IF YES TO 15A:

- 15B. Did you produce phlegm with any of these chest illnesses? 1. Yes 2. No 3. Does not apply

- 15C. In the past year, how many such illnesses with (increased) phlegm did you have which lasted a week or more? Number of illnesses No such illnesses

16. RESPIRATORY SYSTEM

In the past year have you had:

- | | Yes or No | Further Comment on Positive Answers |
|-----------------|-----------|-------------------------------------|
| Asthma | ... | |
| Bronchitis | ... | |
| Hay fever | ... | |
| Other allergies | ... | |

Yes or No	Further Comment on Positive Answers
Pneumonia . . .	
Tuberculosis . . .	
Chest surgery . . .	
Other lung Problems . . .	
Heart disease . . .	
Do you have:	
Yes or No	Further Comment on Positive Answers
Frequent colds . . .	
Chronic cough . . .	
Shortness of breath when walking or climbing one flight of stairs . . .	
Do you:	
Wheeze . . .	
Cough up phlegm . . .	
Smoke cigarettes . . .	Packs per day . . . How many years . . .

Date Signature

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 97-01-079, § 296-62-07741, filed 12/17/96, effective 3/1/97. Statutory Authority: Chapter 49.17 RCW. 87-24-051 (Order 87-24), § 296-62-07741, filed 11/30/87. Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-62-07741, filed 4/27/87.]

WAC 296-62-07743 Appendix E—Interpretation and classification of chest roentgenograms—Mandatory.

(1) Chest roentgenograms shall be interpreted and classified in accordance with a professionally accepted classification system and recorded on an interpretation form following the format of the CDC/NIOSH (M) 2.8 form. As a minimum, the content within the bold lines of this form (items one through four) shall be included. This form is not to be submitted to NIOSH.

(2) Roentgenograms shall be interpreted and classified only by a B-reader, a board eligible/certified radiologist, or an experienced physician with known expertise in pneumoconioses.

(3) All interpreters, whenever interpreting chest roentgenograms made under this section, shall have immediately available for reference a complete set of the ILO-U/C International Classification of Radiographs for Pneumoconioses, 1980.

[Statutory Authority: Chapter 49.17 RCW. 87-24-051 (Order 87-24), § 296-62-07743, filed 11/30/87. Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-62-07743, filed 4/27/87.]

WAC 296-62-07745 Appendix F—Work practices and engineering controls for automotive brake and clutch inspection, disassembly, repair and assembly—Mandatory.

This mandatory appendix specifies engineering controls and work practices that must be implemented by the employer during automotive brake and clutch inspection, disassembly, repair, and assembly operations. Proper use of these engineering controls and work practices will reduce employees' asbestos exposure below the permissible exposure level during clutch and brake inspection, disassembly, repair, and assembly operations. The employer shall institute engineering controls and work practices using either the method set forth in (1) or (2) of this appendix, or any other

method which the employer can demonstrate to be equivalent in terms of reducing employee exposure to asbestos as defined and which meets the requirements described in (3) of this appendix, for those facilities in which no more than 5 pairs of brakes or 5 clutches are inspected, disassembled, reassembled and/or repaired per week, the method set forth in (4) of this appendix may be used:

(1) Negative pressure enclosure/HEPA vacuum system method.

(a) The brake and clutch inspection, disassembly, repair, and assembly operations shall be enclosed to cover and contain the clutch or brake assembly and to prevent the release of asbestos fibers into the worker's breathing zone.

(b) The enclosure shall be sealed tightly and thoroughly inspected for leaks before work begins on brake and clutch inspection, disassembly, repair and assembly.

(c) The enclosure shall be such that the worker can clearly see the operation and shall provide impermeable sleeves through which the worker can handle the brake and clutch inspection, disassembly, repair and assembly. The integrity of the sleeves and ports shall be examined before work begins.

(d) A HEPA-filtered vacuum shall be employed to maintain the enclosure under negative pressure throughout the operation. Compressed-air may be used to remove asbestos fibers or particles from the enclosure.

(e) The HEPA vacuum shall be used first to loosen the asbestos containing residue from the brake and clutch parts and then to evacuate the loosened asbestos containing material from the enclosure and capture the material in the vacuum filter.

(f) The vacuum's filter, when full, shall be first wetted with a fine mist of water, then removed and placed immediately in an impermeable container, labeled according to WAC 296-62-07721 (6)(b) and disposed of according to WAC 296-62-07713 (1)(a) and (2)(f).

(g) Any spills or releases of asbestos containing waste material from inside of the enclosure or vacuum hose or vacuum filter shall be immediately cleaned up and disposed of according to WAC 296-62-07713 (1)(a) and (2)(f).

(2) Low pressure/wet cleaning method.

(a) A catch basin shall be placed under the brake assembly, positioned to avoid splashes and spills.

(b) The reservoir shall contain water containing an organic solvent or wetting agent. The flow of liquid shall be controlled such that the brake assembly is gently flooded to prevent the asbestos-containing brake dust from becoming airborne.

(c) The aqueous solution shall be allowed to flow between the brake drum and brake support before the drum is removed.

(d) After removing the brake drum, the wheel hub and back of the brake assembly shall be thoroughly wetted to suppress dust.

(e) The brake support plate, brake shoes and brake components used to attach the brake shoes shall be thoroughly washed before removing the old shoes.

(f) In systems using filters, the filters, when full, shall be first wetted with a fine mist of water, then removed and placed immediately in an impermeable container, labeled

according to WAC 296-62-07721 (6)(b) and disposed of according to WAC 296-62-07713 (1)(a) and (2)(f).

(g) Any spills of asbestos-containing aqueous solution or any asbestos-containing waste material shall be cleaned up immediately and disposed of according to WAC 296-62-07713 (1)(a) and (2)(f).

(h) The use of dry brushing during low pressure/wet cleaning operations is prohibited.

(3) Equivalent methods. An equivalent method is one which has sufficient written detail so that it can be reproduced and has been demonstrated that the exposures resulting from the equivalent method are equal to or less than the exposure which would result from the use of the method described in subsection (1) of this appendix. For purposes of making this comparison, the employer shall assume that exposures resulting from the use of the method described in subsection (1) of this appendix shall not exceed 0.016 f/cc, as measured by the WISHA reference method and as averaged over at least 18 personal samples.

(4) Wet method.

(a) A spray bottle, hose nozzle, or other implement capable of delivering a fine mist of water or amended water or other delivery system capable of delivering water at low pressure, shall be used to first thoroughly wet the brake and clutch parts. Brake and clutch components shall then be wiped clean with a cloth.

(b) The cloth shall be placed in an impermeable container, labeled according to WAC 296-62-07721 (6)(b) and then disposed of according to WAC 296-62-07713 (1)(a) and (2)(f), or the cloth shall be laundered in a way to prevent the release of asbestos fibers in excess of 0.1 fiber per cubic centimeter of air.

(c) Any spills of solvent or any asbestos containing waste material shall be cleaned up immediately according to WAC 296-62-07713 (1)(a) and (2)(f).

(d) The use of dry brushing during the wet method operations is prohibited.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 97-01-079, § 296-62-07745, filed 12/17/96, effective 3/1/97. Statutory Authority: Chapter 49.17 RCW. 89-11-035 (Order 89-03), § 296-62-07745, filed 5/15/89, effective 6/30/89; 87-24-051 (Order 87-24), § 296-62-07745, filed 11/30/87. Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-62-07745, filed 4/27/87.]

WAC 296-62-07747 Appendix G—Substance technical information for asbestos—Nonmandatory. (1) Substance identification.

(a) Substance: "Asbestos" is the name of a class of magnesium-silicate minerals that occur in fibrous form. Minerals that are included in this group are chrysotile, crocidolite, amosite, tremolite asbestos, anthophyllite asbestos, and actinolite asbestos.

(b) Asbestos is used in the manufacture of heat-resistant clothing, automotive brake and clutch linings, and a variety of building materials including floor tiles, roofing felts, ceiling tiles, asbestos-cement pipe and sheet, and fire-resistant drywall. Asbestos is also present in pipe and boiler insulation materials, and in sprayed-on materials located on beams, in crawlspaces, and between walls.

(c) The potential for a product containing asbestos, tremolite, anthophyllite, and actinolite to release breathable

fibers depends on its degree of friability. Friable means that the material can be crumbled with hand pressure and is therefore likely to emit fibers. The fibrous or fluffy sprayed-on materials used for fireproofing, insulation, or sound proofing are considered to be friable, and they readily release airborne fibers if disturbed. Materials such as vinyl-asbestos floor tile or roofing felts are considered nonfriable and generally do not emit airborne fibers unless subjected to sanding or sawing operations. Asbestos-cement pipe or sheet can emit airborne fibers if the materials are cut or sawed, or if they are broken during demolition operations.

(d) Permissible exposure: Exposure to airborne asbestos fibers may not exceed 0.1 fiber per cubic centimeter of air (0.1 f/cc) averaged over the eight-hour workday (time weighted average), or 1 fiber per cubic centimeter of air (1 f/cc) during any thirty minute period, (excursion limit).

(2) Health hazard data.

(a) Asbestos can cause disabling respiratory disease and various types of cancers if the fibers are inhaled. Inhaling or ingesting fibers from contaminated clothing or skin can also result in these diseases. The symptoms of these diseases generally do not appear for twenty or more years after initial exposure.

(b) Exposure to asbestos has been shown to cause lung cancer, mesothelioma, and cancer of the stomach and colon. Mesothelioma is a rare cancer of the thin membrane lining of the chest and abdomen. Symptoms of mesothelioma include shortness of breath, pain in the walls of the chest, and/or abdominal pain.

(3) Respirators and protective clothing.

(a) Respirators: You are required to wear a respirator when performing tasks that result in asbestos exposure that exceeds 0.1 fiber per cubic centimeter of air (0.1 f/cc) as an eight-hour time weighted average and/or 1.0 fiber per cubic centimeter (1 f/cc) during any thirty minute period (excursion limit). These conditions can occur while your employer is in the process of installing engineering controls to reduce asbestos exposure, or where engineering controls are not feasible to reduce asbestos exposure. Air-purifying respirators equipped with a high-efficiency particulate air (HEPA) filter can be used where airborne asbestos fiber concentrations do not exceed 1 f/cc; otherwise, air-supplied, positive-pressure, full facepiece respirators must be used. Disposable respirators or dust masks are not permitted to be used for asbestos work. For effective protection, respirators must fit your face and head snugly. Your employer is required to conduct fit tests when you are first assigned a respirator and every six months thereafter. Respirators should not be loosened or removed in work situations where their use is required.

(b) Protective clothing: You are required to wear protective clothing in work areas where asbestos fiber concentrations exceed the permissible exposure limits to prevent contamination of the skin. Where protective clothing is required, your employer must provide you with clean garments. Unless you are working on a large asbestos removal or demolition project, your employer must also provide a change room and separate lockers for your street clothes and contaminated work clothes. If you are working on a large asbestos removal or demolition project, and where it is feasible to do so, your employer must provide a clean

room, shower, and decontamination room contiguous to the work area. When leaving the work area, you must remove contaminated clothing before proceeding to the shower. If the shower is not adjacent to the work area, you must vacuum your clothing before proceeding to the change room and shower. To prevent inhaling fibers in contaminated change rooms and showers, leave your respirator on until you leave the shower and enter the clean change room.

(4) Disposal procedures and cleanup.

(a) Wastes that are generated by processes where asbestos is present include:

(i) Empty asbestos shipping containers.

(ii) Process wastes such as cuttings, trimmings, or reject material.

(iii) Housekeeping waste from sweeping or HEPA vacuuming.

(iv) Asbestos fireproofing or insulating material that is removed from buildings.

(v) Building products that contain asbestos removed during building renovation or demolition.

(vi) Contaminated disposable protective clothing.

(b) Empty shipping bags can be flattened under exhaust hoods and packed into airtight containers for disposal. Empty shipping drums are difficult to clean and should be sealed.

(c) Vacuum bags or disposable paper filters should not be cleaned, but should be sprayed with a fine water mist and placed into a labeled waste container.

(d) Process waste and housekeeping waste should be wetted with water or a mixture of water and surfactant prior to packaging in disposable containers.

(e) Material containing asbestos that is removed from buildings must be disposed of in leaktight 6-mil thick plastic bags, plastic-lined cardboard containers, or plastic-lined metal containers. These wastes, which are removed while wet, should be sealed in containers before they dry out to minimize the release of asbestos fibers during handling.

(5) Access to information.

(a) Each year, your employer is required to inform you of the information contained in this standard and appendices for asbestos. In addition, your employer must instruct you in the proper work practices for handling materials containing asbestos and the correct use of protective equipment.

(b) Your employer is required to determine whether you are being exposed to asbestos. You or your representative has the right to observe employee measurements and to record the results obtained. Your employer is required to inform you of your exposure, and, if you are exposed above the permissible limits, he or she is required to inform you of the actions that are being taken to reduce your exposure to within the permissible limits.

(c) Your employer is required to keep records of your exposures and medical examinations. These exposure records must be kept for at least thirty years. Medical records must be kept for the period of your employment plus thirty years.

(d) Your employer is required to release your exposure and medical records to your physician or designated representative upon your written request.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 97-01-079, § 296-62-07747, filed 12/17/96, effective 3/1/97. Statutory Authority:

(1997 Ed.)

Chapter 49.17 RCW. 89-11-035 (Order 89-03), § 296-62-07747, filed 5/15/89, effective 6/30/89; 87-24-051 (Order 87-24), § 296-62-07747, filed 11/30/87. Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-62-07747, filed 4/27/87.]

WAC 296-62-07749 Appendix H—Medical surveillance guidelines for asbestos—Nonmandatory. (1) Route of entry inhalation, ingestion.

(2) Toxicology.

Clinical evidence of the adverse effects associated with exposure to asbestos is present in the form of several well-conducted epidemiological studies of occupationally exposed workers, family contacts of workers, and persons living near asbestos mines. These studies have shown a definite association between exposure to asbestos and an increased incidence of lung cancer, pleural and peritoneal mesothelioma, gastrointestinal cancer, and asbestosis. The latter is a disabling fibrotic lung disease that is caused only by exposure to asbestos. Exposure to asbestos has also been associated with an increased incidence of esophageal, kidney, laryngeal, pharyngeal, and buccal cavity cancers. As with other known chronic occupational diseases, disease associated with asbestos generally appears about twenty years following the first occurrence of exposure: There are no known acute effects associated with exposure to asbestos.

Epidemiological studies indicate that the risk of lung cancer among exposed workers who smoke cigarettes is greatly increased over the risk of lung cancer among nonexposed smokers or exposed nonsmokers. These studies suggest that cessation of smoking will reduce the risk of lung cancer for a person exposed to asbestos but will not reduce it to the same level of risk as that existing for an exposed worker who has never smoked.

(3) Signs and symptoms of exposure-related disease.

The signs and symptoms of lung cancer or gastrointestinal cancer induced by exposure to asbestos are not unique, except that a chest x-ray of an exposed patient with lung cancer may show pleural plaques, pleural calcification, or pleural fibrosis. Symptoms characteristic of mesothelioma include shortness of breath, pain in the walls of the chest, or abdominal pain. Mesothelioma has a much longer latency period compared with lung cancer (forty years versus fifteen to twenty years), and mesothelioma is therefore more likely to be found among workers who were first exposed to asbestos at an early age. Mesothelioma is always fatal.

Asbestosis is pulmonary fibrosis caused by the accumulation of asbestos fibers in the lungs. Symptoms include shortness of breath, coughing, fatigue, and vague feelings of sickness. When the fibrosis worsens, shortness of breath occurs even at rest. The diagnosis of asbestosis is based on a history of exposure to asbestos, the presence of characteristic radiologic changes, endinspiratory crackles (rales), and other clinical features of fibrosing lung disease. Pleural plaques and thickening are observed on x-rays taken during the early stages of the disease. Asbestosis is often a progressive disease even in the absence of continued exposure, although this appears to be a highly individualized characteristic. In severe cases, death may be caused by respiratory or cardiac failure.

(4) Surveillance and preventive considerations.

As noted above, exposure to asbestos has been linked to an increased risk of lung cancer, mesothelioma, gastrointestinal cancer, and asbestosis among occupationally exposed workers. Adequate screening tests to determine an employee's potential for developing serious chronic diseases, such as cancer, from exposure to asbestos do not presently exist. However, some tests, particularly chest x-rays and pulmonary function tests, may indicate that an employee has been overexposed to asbestos increasing his or her risk of developing exposure-related chronic diseases. It is important for the physician to become familiar with the operating conditions in which occupational exposure to asbestos is likely to occur. This is particularly important in evaluating medical and work histories and in conducting physical examinations. When an active employee has been identified as having been overexposed to asbestos measures taken by the employer to eliminate or mitigate further exposure should also lower the risk of serious long-term consequences.

The employer is required to institute a medical surveillance program for all employees who are or will be exposed to asbestos at or above the permissible exposure limits (0.1 fiber per cubic centimeter of air) for 30 or more days per year and for all employees who are assigned to wear a negative pressure respirator. All examinations and procedures must be performed by or under the supervision of a licensed physician, at a reasonable time and place, and at no cost to the employee.

Although broad latitude is given to the physician in prescribing specific tests to be included in the medical surveillance program, WISHA requires inclusion of the following elements in the routine examination:

(a) Medical and work histories with special emphasis directed to symptoms of the respiratory system, cardiovascular system, and digestive tract.

(b) Completion of the respiratory disease questionnaire contained in WAC 296-62-07741, Appendix D.

(c) A physical examination including a chest roentgenogram and pulmonary function test that includes measurement of the employee's forced vital capacity (FVC) and forced expiratory volume at one second (FEV₁).

(d) Any laboratory or other test that the examining physician deems by sound medical practice to be necessary.

The employer is required to make the prescribed tests available at least annually to those employees covered; more often than specified if recommended by the examining physician; and upon termination of employment.

The employer is required to provide the physician with the following information: A copy of this standard and appendices; a description of the employee's duties as they relate to asbestos exposure; the employee's representative level of exposure to asbestos; a description of any personal protective and respiratory equipment used; and information from previous medical examinations of the affected employee that is not otherwise available to the physician. Making this information available to the physician will aid in the evaluation of the employee's health in relation to assigned duties and fitness to wear personal protective equipment, if required.

The employer is required to obtain a written opinion from the examining physician containing the results of the medical examination; the physician's opinion as to whether

the employee has any detected medical conditions that would place the employee at an increased risk of exposure-related disease; any recommended limitations on the employee or on the use of personal protective equipment; and a statement that the employee has been informed by the physician of the results of the medical examination and of any medical conditions related to asbestos exposure that require further explanation or treatment. This written opinion must not reveal specific findings or diagnoses unrelated to exposure to asbestos and a copy of the opinion must be provided to the affected employee.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 97-01-079, § 296-62-07749, filed 12/17/96, effective 3/1/97. Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-62-07749, filed 7/20/94, effective 9/20/94; 87-24-051 (Order 87-24), § 296-62-07749, filed 11/30/87. Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-62-07749, filed 4/27/87.]

WAC 296-62-07751 Appendix I—Work practices and engineering controls for Class I asbestos operations—Nonmandatory. This is a nonmandatory appendix to the asbestos standards for construction and for shipyards. It describes criteria and procedures for erecting and using negative pressure enclosures for Class I Asbestos Work, when NPEs are used as an allowable control method to comply with WAC 296-62-07712 (7)(a). Many small and variable details are involved in the erection of a negative pressure enclosure. OSHA and most participants in the rulemaking agreed that only the major, more performance oriented criteria should be made mandatory. These criteria are set out in WAC 296-62-07712. In addition, this appendix includes these mandatory specifications and procedures in its guidelines in order to make this appendix coherent and helpful. The mandatory nature of the criteria which appear in the regulatory text is not changed because they are included in this "nonmandatory" appendix. Similarly, the additional criteria and procedures included as guidelines in the appendix, do not become mandatory because mandatory criteria are also included in these comprehensive guidelines.

In addition, none of the criteria, both mandatory and recommended, are meant to specify or imply the need for use of patented or licensed methods or equipment. Recommended specifications included in this attachment should not discourage the use of creative alternatives which can be shown to reliably achieve the objectives of negative-pressure enclosures.

Requirements included in this appendix, cover general provisions to be followed in all asbestos jobs, provisions which must be followed for all Class I asbestos jobs, and provisions governing the construction and testing of negative pressure enclosures. The first category includes the requirement for use of wet methods, HEPA vacuums, and immediate bagging of waste; Class I work must conform to the following provisions:

- oversight by competent person
- use of critical barriers over all openings to work area
- isolation of HVAC systems
- use of impermeable dropcloths and coverage of all objects within regulated areas

In addition, more specific requirements for NPEs include:

- maintenance of -0.02 inches water gauge within enclosure
- manometric measurements
- air movement away from employees performing removal work
- smoke testing or equivalent for detection of leaks and air direction
- deactivation of electrical circuits, if not provided with ground-fault circuit interrupters.

Planning the Project

The standard requires that an exposure assessment be conducted before the asbestos job is begun WAC 296-62-07709(3). Information needed for that assessment, includes data relating to prior similar jobs, as applied to the specific variables of the current job. The information needed to conduct the assessment will be useful in planning the project, and in complying with any reporting requirements under this standard, when significant changes are being made to a control system listed in the standard, (see WAC 296-62-07719), as well as those of USEPA (40 CFR Part 61, subpart M). Thus, although the standard does not explicitly require the preparation of a written asbestos removal plan, the usual constituents of such a plan, i.e., a description of the enclosure, the equipment, and the procedures to be used throughout the project, must be determined before the enclosure can be erected. The following information should be included in the planning of the system:

A physical description of the work area;

A description of the approximate amount of material to be removed;

A schedule for turning off and sealing existing ventilation systems;

Personnel hygiene procedures;

A description of personal protective equipment and clothing to be worn by employees;

A description of the local exhaust ventilation systems to be used and how they are to be tested;

A description of work practices to be observed by employees;

An air monitoring plan;

A description of the method to be used to transport waste material; and

The location of the dump site.

Materials and Equipment Necessary for Asbestos Removal

Although individual asbestos removal projects vary in terms of the equipment required to accomplish the removal of the materials, some equipment and materials are common to most asbestos removal operations.

Plastic sheeting used to protect horizontal surfaces, seal HVAC openings or to seal vertical openings and ceilings should have a minimum thickness of 6 mils. Tape or other adhesive used to attach plastic sheeting should be of sufficient adhesive strength to support the weight of the material plus all stresses encountered during the entire duration of the project without becoming detached from the surface.

Other equipment and materials which should be available at the beginning of each project are:

- HEPA Filtered Vacuum is essential for cleaning the work area after the asbestos has been removed. It should have a long hose capable of reaching out-of-the-way places, such as areas above ceiling tiles, behind pipes, etc.
- Portable air ventilation systems installed to provide the negative air pressure and air removal from the enclosure must be equipped with a HEPA filter. The number and capacity of units required to ventilate an enclosure depend on the size of the area to be ventilated. The filters for these systems should be designed in such a manner that they can be replaced when the air flow volume is reduced by the build-up of dust in the filtration material. Pressure monitoring devices with alarms and strip chart recorders attached to each system to indicate the pressure differential and the loss due to dust buildup on the filter are recommended.
- Water sprayers should be used to keep the asbestos material as saturated as possible during removal; the sprayers will provide a fine mist that minimizes the impact of the spray on the material.
- Water used to saturate the asbestos containing material can be amended by adding at least 15 milliliters (½ ounce) of wetting agent in 1 liter (1 pint) of water. An example of a wetting agent is a 50/50 mixture of polyoxyethylene ether and polyoxyethylene polyglycol ester.
- Backup power supplies are recommended, especially for ventilation systems.
- Shower and bath water should be with mixed hot and cold water faucets. Water that has been used to clean personnel or equipment should either be filtered or be collected and discarded as asbestos waste. Soap and shampoo should be provided to aid in removing dust from the workers' skin and hair.
- See WAC 296-62-07715 and 296-62-07717 for appropriate respiratory protection and protective clothing.
- See WAC 296-62-07721 for required signs and labels.

Preparing the Work Area

Disabling HVAC Systems: The power to the heating, ventilation, and air conditioning systems that service the restricted area must be deactivated and locked off. All ducts, grills, access ports, windows and vents must be sealed off with two layers of plastic to prevent entrainment of contaminated air.

Operating HVAC Systems in the Restricted Area: If components of a HVAC system located in the restricted area are connected to a system that will service another zone during the project, the portion of the duct in the restricted area must be sealed and pressurized. Necessary precautions include caulking the duct joints, covering all cracks and openings with two layers of sheeting, and pressurizing the duct throughout the duration of the project by restricting the return air flow. The power to the fan supplying the positive pressure should be locked "on" to prevent pressure loss.

Sealing Elevators: If an elevator shaft is located in the restricted area, it should be either shut down or isolated by

sealing with two layers of plastic sheeting. The sheeting should provide enough slack to accommodate the pressure changes in the shaft without breaking the air-tight seal.

Removing Mobile Objects: All movable objects should be cleaned and removed from the work area before an enclosure is constructed unless moving the objects creates a hazard. Mobile objects will be assumed to be contaminated and should be either cleaned with amended water and a HEPA vacuum and then removed from the area or wrapped and then disposed of as hazardous waste.

Cleaning and Sealing Surfaces: After cleaning with water and a HEPA vacuum, surfaces of stationary objects should be covered with two layers of plastic sheeting. The sheeting should be secured with duct tape or an equivalent method to provide a tight seal around the object.

Bagging Waste: In addition to the requirement for immediate bagging of waste for disposal, it is further recommended that the waste material be double-bagged and sealed in plastic bags designed for asbestos disposal. The bags should be stored in a waste storage area that can be controlled by the workers conducting the removal. Filters removed from air handling units and rubbish removed from the area are to be bagged and handled as hazardous waste.

Constructing the Enclosure

The enclosure should be constructed to provide an air-tight seal around ducts and openings into existing ventilation systems and around penetrations for electrical conduits, telephone wires, water lines, drain pipes, etc. Enclosures should be both airtight and watertight except for those openings designed to provide entry and/or air flow control.

Size: An enclosure should be the minimum volume to encompass all of the working surfaces yet allow unencumbered movement by the worker(s), provide unrestricted air flow past the worker(s), and ensure walking surfaces can be kept free of tripping hazards.

Shape: The enclosure may be any shape that optimizes the flow of ventilation air past the worker(s).

Structural Integrity: The walls, ceilings and floors must be supported in such a manner that portions of the enclosure will not fall down during normal use.

Openings: It is not necessary that the structure be airtight; openings may be designed to direct air flow. Such openings should be located at a distance from active removal operations. They should be designed to draw air into the enclosure under all anticipated circumstances. In the event that negative pressure is lost, they should be fitted with either HEPA filters to trap dust or automatic trap doors that prevent dust from escaping the enclosure. Openings for exits should be controlled by an airlock or a vestibule.

Barrier Supports: Frames should be constructed to support all unsupported spans of sheeting.

Sheeting: Walls, barriers, ceilings, and floors should be lined with two layers of plastic sheeting having a thickness of at least 6 mil.

Seams: Seams in the sheeting material should be minimized to reduce the possibilities of accidental rips and tears in the adhesive or connections. All seams in the sheeting should overlap, be staggered and not be located at corners or wall-to-floor joints.

Areas Within an Enclosure: Each enclosure consists of a work area, a decontamination area, and waste storage area.

The work area where the asbestos removal operations occur should be separated from both the waste storage area and the contamination control area by physical curtains, doors, and/or airflow patterns that force any airborne contamination back into the work area.

See WAC 296-62-07719 for requirements for hygiene facilities.

During egress from the work area, each worker should step into the equipment room, clean tools and equipment, and remove gross contamination from clothing by wet cleaning and HEPA vacuuming. Before entering the shower area, foot coverings, head coverings, hand coverings, and coveralls are removed and placed in impervious bags for disposal or cleaning. Airline connections from airline respirators with HEPA disconnects and power cables from powered air-purifying respirators (PAPRs) will be disconnected just prior to entering the shower room.

Establishing Negative Pressure Within the Enclosure

Negative Pressure: Air is to be drawn into the enclosure under all anticipated conditions and exhausted through a HEPA filter for 24 hours a day during the entire duration of the project.

Air Flow Tests: Air flow patterns will be checked before removal operations begin, at least once per operating shift and any time there is a question regarding the integrity of the enclosure. The primary test for air flow is to trace air currents with smoke tubes or other visual methods. Flow checks are made at each opening and at each doorway to demonstrate that air is being drawn into the enclosure and at each worker's position to show that air is being drawn away from the breathing zone.

Monitoring Pressure Within the Enclosure: After the initial air flow patterns have been checked, the static pressure must be monitored within the enclosure. Monitoring may be made using manometers, pressure gauges, or combinations of these devices. It is recommended that they be attached to alarms and strip chart recorders at points identified by the design engineer.

Corrective Actions: If the manometers or pressure gauges demonstrate a reduction in pressure differential below the required level, work should cease and the reason for the change investigated and appropriate changes made. The air flow patterns should be retested before work begins again.

Pressure Differential: The design parameters for static pressure differentials between the inside and outside of enclosures typically range from 0.02 to 0.10 inches of water gauge, depending on conditions. All zones inside the enclosure must have less pressure than the ambient pressure outside of the enclosure (-0.02 inches water gauge differential). Design specifications for the differential vary according to the size, configuration, and shape of the enclosure as well as ambient and mechanical air pressure conditions around the enclosure.

Air Flow Patterns: The flow of air past each worker shall be enhanced by positioning the intakes and exhaust ports to remove contaminated air from the worker's breathing zone, by positioning HEPA vacuum cleaners to draw air from the worker's breathing zone, by forcing relatively uncontaminated air past the worker toward an exhaust port, or by using a combination of methods to reduce the worker's exposure.

Air Handling Unit Exhaust: The exhaust plume from air handling units should be located away from adjacent personnel and intakes for HVAC systems.

Air Flow Volume: The air flow volume (cubic meters per minute) exhausted (removed) from the workplace must exceed the amount of makeup air supplied to the enclosure. The rate of air exhausted from the enclosure should be designed to maintain a negative pressure in the enclosure and air movement past each worker. The volume of air flow removed from the enclosure should replace the volume of the container at every 5 to 15 minutes. Air flow volume will need to be relatively high for large enclosures, enclosures with awkward shapes, enclosures with multiple openings, and operations employing several workers in the enclosure.

Air Flow Velocity: At each opening, the air flow velocity must visibly "drag" air into the enclosure. The velocity of air flow within the enclosure must be adequate to remove airborne contamination from each worker's breathing zone without disturbing the asbestos-containing material on surfaces.

Airlocks: Airlocks are mechanisms on doors and curtains that control the air flow patterns in the doorways. If air flow occurs, the patterns through doorways must be such that the air flows toward the inside of the enclosure. Sometimes vestibules, double doors, or double curtains are used to prevent air movement through the doorways. To use a vestibule, a worker enters a chamber by opening the door or curtain and then closing the entry before opening the exit door or curtain.

Airlocks should be located between the equipment room and shower room, between the shower room and the clean room, and between the waste storage area and the outside of the enclosure. The air flow between adjacent rooms must be checked using smoke tubes or other visual tests to ensure the flow patterns draw air toward the work area without producing eddies.

Monitoring for Airborne Concentrations

In addition to the breathing zone samples taken as outlined in WAC 296-62-07709, samples of air should be taken to demonstrate the integrity of the enclosure, the cleanliness of the clean room and shower area, and the effectiveness of the HEPA filter. If the clean room is shown to be contaminated, the room must be relocated to an uncontaminated area.

Samples taken near the exhaust of portable ventilation systems must be done with care.

General Work Practices

Preventing dust dispersion is the primary means of controlling the spread of asbestos within the enclosure. Whenever practical, the point of removal should be isolated, enclosed, covered, or shielded from the workers in the area. Waste asbestos containing materials must be bagged during or immediately after removal; the material must remain saturated until the waste container is sealed.

Waste material with sharp points or corners must be placed in hard air-tight containers rather than bags.

Whenever possible, large components should be sealed in plastic sheeting and removed intact.

Bags or containers of waste will be moved to the waste holding area, washed, and wrapped in a bag with the appropriate labels.

Cleaning the Work Area

Surfaces within the work area should be kept free of visible dust and debris to the extent feasible. Whenever visible dust appears on surfaces, the surfaces within the enclosure must be cleaned by wiping with a wet sponge, brush, or cloth and then vacuumed with a HEPA vacuum.

All surfaces within the enclosure should be cleaned before the exhaust ventilation system is deactivated and the enclosure is disassembled. An approved encapsulant may be sprayed onto areas after the visible dust has been removed.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 97-01-079, § 296-62-07751, filed 12/17/96, effective 3/1/97. Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-62-07751, filed 7/20/94, effective 9/20/94; 87-24-051 (Order 87-24), § 296-62-07751, filed 11/30/87.]

WAC 296-62-07753 Appendix J—Polarized light microscopy of asbestos—Nonmandatory. Method number: ID-191

Matrix: Bulk

Collection Procedure

Collect approximately 1 to 2 grams of each type of material and place into separate 20 mL scintillation vials.

Analytical Procedure

A portion of each separate phase is analyzed by gross examination, phase-polar examination, and central stop dispersion microscopy.

Commercial manufacturers and products mentioned in this method are for descriptive use only and do not constitute endorsements by USDOL-WISHA. Similar products from other sources may be substituted.

(1) Introduction

This method describes the collection and analysis of asbestos bulk materials by light microscopy techniques including phase-polar illumination and central-stop dispersion microscopy. Some terms unique to asbestos analysis are defined below:

Amphibole: A family of minerals whose crystals are formed by long, thin units which have two thin ribbons of double chain silicate with a brucite ribbon in between. The shape of each unit is similar to an "I beam." Minerals important in asbestos analysis include cummingtonite-grunerite, crocidolite, tremolite-actinolite and anthophyllite.

Asbestos: A term for naturally occurring fibrous minerals. Asbestos includes chrysotile, cummingtonite-grunerite asbestos (amosite), anthophyllite asbestos, tremolite asbestos, crocidolite, actinolite asbestos and any of these minerals which have been chemically treated or altered. The precise chemical formulation of each species varies with the location from which it was mined. Nominal compositions are listed:

Chrysotile	$Mg_3Si_2O_5(OH)_4$
Crocidolite (Riebeckite asbestos)	$Na_2Fe_32+Fe_23+Si_8O_{22}(OH)_2$
Cummingtonite-Grunerite asbestos (Amosite)	$(Mg,Fe)_7Si_8O_{22}(OH)_2$
Tremolite-Actinolite asbestos	$Ca_2(Mg,Fe)_5Si_8O_{22}(OH)_2$
Anthophyllite asbestos	$(Mg,Fe)_7Si_8O_{22}(HO)_2$

- Asbestos Fiber:* A fiber of asbestos meeting the criteria for a fiber. (See section (3)(e))
- Aspect Ratio:* The ratio of the length of a fiber to its diameter usually defined as "length: width", e.g. 3:1.
- Brucite:* A sheet mineral with the composition $\text{mg}(\text{OH})_2$.

Central Stop Dispersion Staining (microscope): This is a dark field microscope technique that images particles using only light refracted by the particle, excluding light that travels through the particle unrefracted. This is usually accomplished with a McCrone objective or other arrangement which places a circular stop with apparent aperture equal to the objective aperture in the back focal plane of the microscope.

Cleavage Fragments: Mineral particles formed by the comminution of minerals, especially those characterized by relatively parallel sides and moderate aspect ratio.

Differential Counting: The term applied to the practice of excluding certain kinds of fibers from a phase contrast asbestos count because they are not asbestos.

Fiber: A particle longer than or equal to 5 microns with a length to width ratio greater than or equal to 3:1. This may include cleavage fragments. (See section (3)(e) of this appendix).

Phase Contrast: Contrast obtained in the microscope by causing light scattered by small particles to destructively interfere with unscattered light, thereby enhancing the visibility of very small particles and particles with very low intrinsic contrast.

Phase Contrast Microscope: A microscope configured with a phase mask pair to create phase contrast. The technique which uses this is called Phase Contrast Microscopy (PCM).

Phase-Polar Analysis: This is the use of polarized light in a phase contrast microscope. It is used to see the same size fibers that are visible in air filter analysis. Although fibers finer than 1 micron are visible, analysis of these is inferred from analysis of larger bundles that are usually present.

Phase-Polar Microscope: The phase-polar microscope is a phase contrast microscope which has an analyzer, a polarizer, a first order red plate and a rotating phase condenser all in place so that the polarized light image is enhanced by phase contrast.

Sealing Encapsulant: This is a product which can be applied, preferably by spraying, onto an asbestos surface which will seal the surface so that fibers cannot be released.

Serpentine: A mineral family consisting of minerals with the general composition $\text{Mg}_3(\text{Si}_2\text{O}_5(\text{OH})_4)$ having the magnesium in brucite layer over a silicate layer. Minerals important in asbestos analysis included in this family are chrysotile, lizardite, antigorite.

(a) History

Light microscopy has been used for well over 100 years for the determination of mineral species. This analysis is carried out using specialized polarizing microscopes as well as bright field microscopes. The identification of minerals is an on-going process with many new minerals described each year. The first recorded use of asbestos was in Finland

about 2500 B.C. where the material was used in the mud wattle for the wooden huts the people lived in as well as strengthening for pottery. Adverse health aspects of the mineral were noted nearly 2000 years ago when Pliny the Younger wrote about the poor health of slaves in the asbestos mines. Although known to be injurious for centuries, the first modern references to its toxicity were by the British Labor Inspectorate when it banned asbestos dust from the workplace in 1898. Asbestosis cases were described in the literature after the turn of the century. Cancer was first suspected in the mid 1930's and a causal link to mesothelioma was made in 1965. Because of the public concern for worker and public safety with the use of this material, several different types of analysis were applied to the determination of asbestos content. Light microscopy requires a great deal of experience and craft. Attempts were made to apply less subjective methods to the analysis. X-ray diffraction was partially successful in determining the mineral types but was unable to separate out the fibrous portions from the nonfibrous portions. Also, the minimum detection limit for asbestos analysis by X-ray diffraction (XRD) is about 1%. Differential Thermal Analysis (DTA) was no more successful. These provide useful corroborating information when the presence of asbestos has been shown by microscopy; however, neither can determine the difference between fibrous and nonfibrous minerals when both habits are present. The same is true of Infrared Absorption (IR).

When electron microscopy was applied to asbestos analysis, hundreds of fibers were discovered present too small to be visible in any light microscope. There are two different types of electron microscopes used for asbestos analysis: Scanning Electron Microscope (SEM) and Transmission Electron Microscope (TEM). Scanning Electron Microscopy is useful in identifying minerals. The SEM can provide two of the three pieces of information required to identify fibers by electron microscopy: Morphology and chemistry. The third is structure as determined by Selected Area Electron Diffraction-SAED which is performed in the TEM. Although the resolution of the SEM is sufficient for very fine fibers to be seen, accuracy of chemical analysis that can be performed on the fibers varies with fiber diameter in fibers of less than 0.2 micron diameter. The TEM is a powerful tool to identify fibers too small to be resolved by light microscopy and should be used in conjunction with this method when necessary. The TEM can provide all three pieces of information required for fiber identification. Most fibers thicker than 1 micron can adequately be defined in the light microscope. The light microscope remains as the best instrument for the determination of mineral type. This is because the minerals under investigation were first described analytically with the light microscope. It is inexpensive and gives positive identification for most samples analyzed. Further, when optical techniques are inadequate, there is ample indication that alternative techniques should be used for complete identification of the sample.

(b) Principle

Minerals consist of atoms that may be arranged in random order or in a regular arrangement. Amorphous materials have atoms in random order while crystalline materials have long range order. Many materials are

transparent to light, at least for small particles or for thin sections. The properties of these materials can be investigated by the effect that the material has on light passing through it. The six asbestos minerals are all crystalline with particular properties that have been identified and cataloged. These six minerals are anisotropic. They have a regular array of atoms, but the arrangement is not the same in all directions. Each major direction of the crystal presents a different regularity. Light photons travelling in each of these main directions will encounter different electrical neighborhoods, affecting the path and time of travel. The techniques outlined in this method use the fact that light traveling through fibers or crystals in different directions will behave differently, but predictably. The behavior of the light as it travels through a crystal can be measured and compared with known or determined values to identify the mineral species. Usually, Polarized Light Microscopy (PLM) is performed with strain-free objectives on a bright-field microscope platform. This would limit the resolution of the microscope to about 0.4 micron. Because WISHA requires the counting and identification of fibers visible in phase contrast, the phase contrast platform is used to visualize the fibers with the polarizing elements added into the light path. Polarized light methods cannot identify fibers finer than about 1 micron in diameter even though they are visible. The finest fibers are usually identified by inference from the presence of larger, identifiable fiber bundles. When fibers are present, but not identifiable by light microscopy, use either SEM or TEM to determine the fiber identity.

(c) Advantages and Disadvantages

The advantages of light microscopy are:

(i) Basic identification of the materials was first performed by light microscopy and gross analysis. This provides a large base of published information against which to check analysis and analytical technique.

(ii) The analysis is specific to fibers. The minerals present can exist in asbestiform, fibrous, prismatic, or massive varieties all at the same time. Therefore, bulk methods of analysis such as X-ray diffraction, IR analysis, DTA, etc. are inappropriate where the material is not known to be fibrous.

(iii) The analysis is quick, requires little preparation time, and can be performed on-site if a suitably equipped microscope is available.

The disadvantages are:

(iv) Even using phase-polar illumination, not all the fibers present may be seen. This is a problem for very low asbestos concentrations where agglomerations or large bundles of fibers may not be present to allow identification by inference.

(v) The method requires a great degree of sophistication on the part of the microscopist. An analyst is only as useful as his mental catalog of images. Therefore, a microscopist's accuracy is enhanced by experience. The mineralogical training of the analyst is very important. It is the basis on which subjective decisions are made.

(vi) The method uses only a tiny amount of material for analysis. This may lead to sampling bias and false results (high or low). This is especially true if the sample is severely inhomogeneous.

(vii) Fibers may be bound in a matrix and not distinguishable as fibers so identification cannot be made.

(d) Method Performance

(i) This method can be used for determination of asbestos content from 0 to 100% asbestos. The detection limit has not been adequately determined, although for selected samples, the limit is very low, depending on the number of particles examined. For mostly homogeneous, finely divided samples, with no difficult fibrous interferences, the detection limit is below 1%. For inhomogeneous samples (most samples), the detection limit remains undefined. NIST has conducted proficiency testing of laboratories on a national scale. Although each round is reported statistically with an average, control limits, etc., the results indicate a difficulty in establishing precision especially in the low concentration range. It is suspected that there is significant bias in the low range especially near 1%. EPA tried to remedy this by requiring a mandatory point counting scheme for samples less than 10%. The point counting procedure is tedious, and may introduce significant biases of its own. It has not been incorporated into this method.

(ii) The precision and accuracy of the quantitation tests performed in this method are unknown. Concentrations are easier to determine in commercial products where asbestos was deliberately added because the amount is usually more than a few percent. An analyst's results can be "calibrated" against the known amounts added by the manufacturer. For geological samples, the degree of homogeneity affects the precision.

(iii) The performance of the method is analyst dependent. The analyst must choose carefully and not necessarily randomly the portions for analysis to assure that detection of asbestos occurs when it is present. For this reason, the analyst must have adequate training in sample preparation, and experience in the location and identification of asbestos in samples. This is usually accomplished through substantial on-the-job training as well as formal education in mineralogy and microscopy.

(e) Interferences

Any material which is long, thin, and small enough to be viewed under the microscope can be considered an interference for asbestos. There are literally hundreds of interferences in workplaces. The techniques described in this method are normally sufficient to eliminate the interferences. An analyst's success in eliminating the interferences depends on proper training.

Asbestos minerals belong to two mineral families: The serpentines and the amphiboles. In the serpentine family, the only common fibrous mineral is chrysotile. Occasionally, the mineral antigorite occurs in a fibril habit with morphology similar to the amphiboles. The amphibole minerals consist of a score of different minerals of which only five are regulated by federal standard: Amosite, crocidolite, anthophyllite asbestos, tremolite asbestos and actinolite asbestos. These are the only amphibole minerals that have been commercially exploited for their fibrous properties; however, the rest can and do occur occasionally in asbestiform habit.

In addition to the related mineral interferences, other minerals common in building material may present a problem for some microscopists: Gypsum, anhydrite,

brucite, quartz fibers, talc fibers or ribbons, wollastonite, perlite, attapulgite, etc. Other fibrous materials commonly present in workplaces are: Fiberglass, mineral wool, ceramic wool, refractory ceramic fibers, kevlar, nomex, synthetic fibers, graphite or carbon fibers, cellulose (paper or wood) fibers, metal fibers, etc.

Matrix embedding material can sometimes be a negative interference. The analyst may not be able to easily extract the fibers from the matrix in order to use the method. Where possible, remove the matrix before the analysis, taking careful note of the loss of weight. Some common matrix materials are: Vinyl, rubber, tar, paint, plant fiber, cement, and epoxy. A further negative interference is that the asbestos fibers themselves may be either too small to be seen in Phase Contrast Microscopy (PCM) or of a very low fibrous quality, having the appearance of plant fibers. The analyst's ability to deal with these materials increases with experience.

(f) Uses and Occupational Exposure

Asbestos is ubiquitous in the environment. More than 40% of the land area of the United States is composed of minerals which may contain asbestos. Fortunately, the actual formation of great amounts of asbestos is relatively rare. Nonetheless, there are locations in which environmental exposure can be severe such as in the Serpentine Hills of California.

There are thousands of uses for asbestos in industry and the home. Asbestos abatement workers are the most current segment of the population to have occupational exposure to great amounts of asbestos. If the material is undisturbed, there is no exposure. Exposure occurs when the asbestos-containing material is abraded or otherwise disturbed during maintenance operations or some other activity. Approximately 95% of the asbestos in place in the United States is chrysotile.

Amosite and crocidolite make up nearly all the difference. Tremolite and anthophyllite make up a very small percentage. Tremolite is found in extremely small amounts in certain chrysotile deposits. Actinolite exposure is probably greatest from environmental sources, but has been identified in vermiculite containing, sprayed-on insulating materials which may have been certified as asbestos-free.

(g) Physical and Chemical Properties

The nominal chemical compositions for the asbestos minerals were given in subsection (1). Compared to cleavage fragments of the same minerals, asbestiform fibers possess a high tensile strength along the fiber axis. They are chemically inert, noncombustible, and heat resistant. Except for chrysotile, they are insoluble in Hydrochloric acid (HCl). Chrysotile is slightly soluble in HCl. Asbestos has high electrical resistance and good sound absorbing characteristics. It can be woven into cables, fabrics or other textiles, or matted into papers, felts, and mats.

(h) Toxicology (This Section is for Information Only and Should Not Be Taken as WISHA Policy)

Possible physiologic results of respiratory exposure to asbestos are mesothelioma of the pleura or peritoneum, interstitial fibrosis, asbestosis, pneumoconiosis, or respiratory cancer. The possible consequences of asbestos exposure are detailed in the NIOSH Criteria Document or in the WISHA Asbestos Standards, WAC 296-62-077.

(2) Sampling Procedure

(a) Equipment for Sampling

- (i) Tube or cork borer sampling device
- (ii) Knife
- (iii) 20 mL scintillation vial or similar vial
- (iv) Sealing encapsulant

(b) Safety Precautions

Asbestos is a known carcinogen. Take care when sampling. While in an asbestos-containing atmosphere, a properly selected and fit-tested respirator should be worn. Take samples in a manner to cause the least amount of dust. Follow these general guidelines:

- (i) Do not make unnecessary dust.
- (ii) Take only a small amount (1 to 2 g).
- (iii) Tightly close the sample container.
- (iv) Use encapsulant to seal the spot where the sample was taken, if necessary.

(c) Sampling procedure

Samples of any suspect material should be taken from an inconspicuous place. Where the material is to remain, seal the sampling wound with an encapsulant to eliminate the potential for exposure from the sample site. Microscopy requires only a few milligrams of material. The amount that will fill a 20 mL scintillation vial is more than adequate. Be sure to collect samples from all layers and phases of material. If possible, make separate samples of each different phase of the material. This will aid in determining the actual hazard. DO NOT USE ENVELOPES, PLASTIC OR PAPER BAGS OF ANY KIND TO COLLECT SAMPLES. The use of plastic bags presents a contamination hazard to laboratory personnel and to other samples. When these containers are opened, a bellows effect blows fibers out of the container onto everything, including the person opening the container.

If a cork-borer type sampler is available, push the tube through the material all the way, so that all layers of material are sampled. Some samplers are intended to be disposable. These should be capped and sent to the laboratory. If a nondisposable cork borer is used, empty the contents into a scintillation vial and send to the laboratory. Vigorously and completely clean the cork borer between samples.

(d) Shipment

Samples packed in glass vials must not touch or they might break in shipment.

- (i) Seal the samples with a sample seal over the end to guard against tampering and to identify the sample.
- (ii) Package the bulk samples in separate packages from the air samples. They may cross-contaminate each other and will invalidate the results of the air samples.
- (iii) Include identifying paperwork with the samples, but not in contact with the suspected asbestos.
- (iv) To maintain sample accountability, ship the samples by certified mail, overnight express, or hand carry them to the laboratory.

(3) Analysis

The analysis of asbestos samples can be divided into two major parts: Sample preparation and microscopy. Because of the different asbestos uses that may be encountered by the analyst, each sample may need different preparation steps. The choices are outlined below. There are several different tests that are performed to identify the

asbestos species and determine the percentage. They will be explained below.

(a) Safety

(i) Do not create unnecessary dust. Handle the samples in HEPA-filter equipped hoods. If samples are received in bags, envelopes or other inappropriate container, open them only in a hood having a face velocity at or greater than 100 fpm. Transfer a small amount to a scintillation vial and only handle the smaller amount.

(ii) Open samples in a hood, never in the open lab area.

(iii) Index of refraction oils can be toxic. Take care not to get this material on the skin. Wash immediately with soap and water if this happens.

(iv) Samples that have been heated in the muffle furnace or the drying oven may be hot. Handle them with tongs until they are cool enough to handle.

(v) Some of the solvents used, such as THF (tetrahydrofuran), are toxic and should only be handled in an appropriate fume hood and according to instructions given in the Material Safety Data Sheet (MSDS).

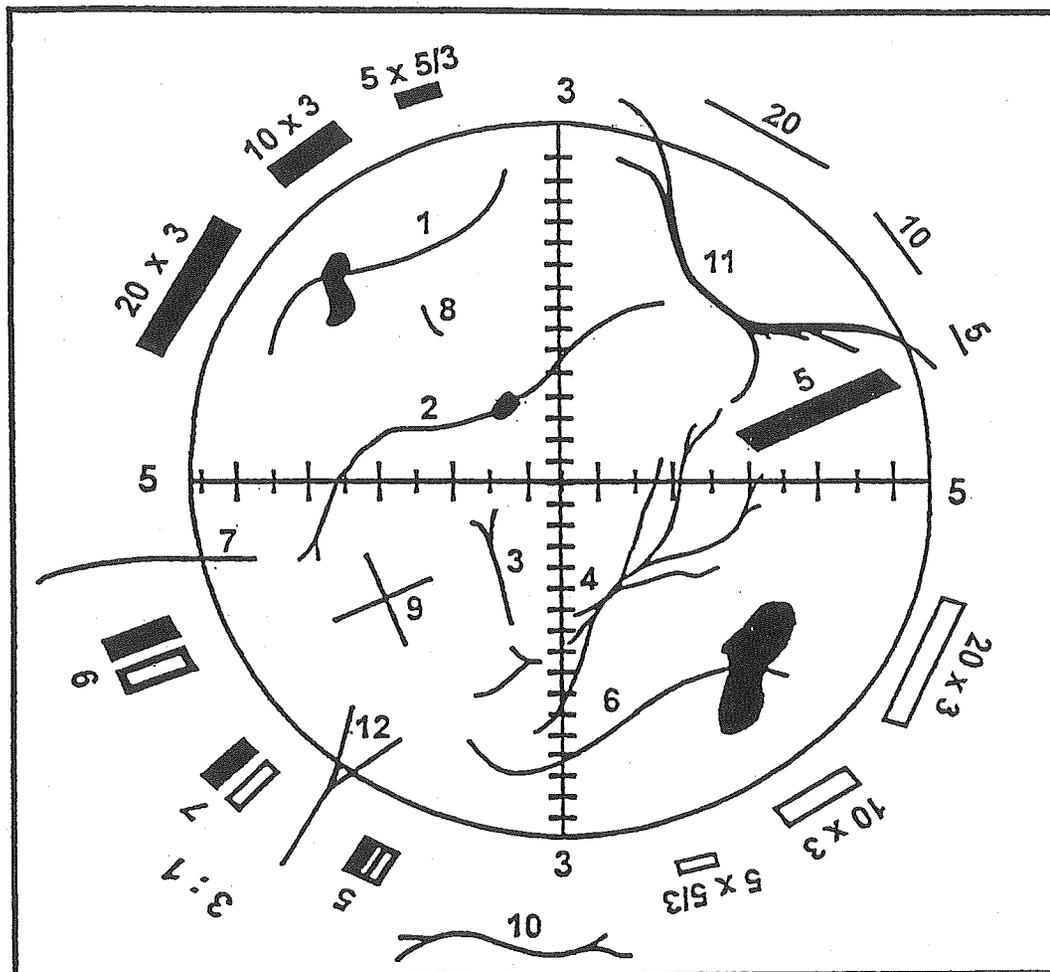


Figure 1: Walton-Beckett Graticule with some explanatory fibers.

Counts for the Fibers in the Figure

Structure No.	Count	Explanation
1 to 6	1	Single fibers all contained within the circle.
7	1/2	Fiber crosses circle once.
8	0	Fiber too short.
9	2	Two crossing fibers.
10	0	Fiber outside graticule.
11	0	Fiber crosses graticule twice.
12	1/2	Although split, fiber only crosses once.

(b) Equipment

(i) Phase contrast microscope with 10x, 16x and 40x objectives, 10x wide-field eyepieces, G-22 Walton-Beckett graticule, Whipple disk, polarizer, analyzer and first order red or gypsum plate, 100 Watt illuminator, rotating position condenser with oversize phase rings, central stop dispersion objective, Kohler illumination and a rotating mechanical stage. (See Figure 1).

(ii) Stereo microscope with reflected light illumination, transmitted light illumination, polarizer, analyzer and first order red or gypsum plate, and rotating stage.

(iii) Negative pressure hood for the stereo microscope

(iv) Muffle furnace capable of 600 degrees C

(v) Drying oven capable of 50-150 degrees C

(vi) Aluminum specimen pans

(vii) Tongs for handling samples in the furnace

(viii) High dispersion index of refraction oils (Special for dispersion staining.)

n=1.550

n=1.585

n=1.590

n=1.605

n=1.620

n=1.670

n=1.680

n=1.690

(ix) A set of index of refraction oils from about n=1.350 to n=2.000 in n=0.005 increments. (Standard for Becke line analysis.)

(x) Glass slides with painted or frosted ends 1 x 3 inches 1mm thick, precleaned.

(xi) Cover Slips 22 x 22 mm, #1 1/2

(xii) Paper clips or dissection needles

(xiii) Hand grinder

(xiv) Scalpel with both #10 and #11 blades

(xv) 0.1 molar HCl

(xvi) Decalcifying solution (Baxter Scientific Products) Ethylenediaminetetraacetic Acid,

(xvii) Tetrasodium....0.7 g/l

Sodium Potassium Tartrate....8.0 mg/liter

Hydrochloric Acid....99.2 g/liter

Sodium Tartrate....0.14 g/liter

Tetrahydrofuran (THF)

(xviii) Hotplate capable of 60 degrees C

(xix) Balance

(xx) Hacksaw blade

(xxi) Ruby mortar and pestle

(c) Sample Pre-Preparation

Sample preparation begins with pre-preparation which may include chemical reduction of the matrix, heating the sample to dryness or heating in the muffle furnace. The end result is a sample which has been reduced to a powder that is sufficiently fine to fit under the cover slip. Analyze different phases of samples separately, e.g., tile and the tile mastic should be analyzed separately as the mastic may contain asbestos while the tile may not.

(i) Wet Samples

Samples with a high water content will not give the proper dispersion colors and must be dried prior to sample mounting. Remove the lid of the scintillation vial, place the bottle in the drying oven and heat at 100 degrees C to

dryness (usually about 2 h). Samples which are not submitted to the lab in glass must be removed and placed in glass vials or aluminum weighing pans before placing them in the drying oven.

(ii) Samples With Organic Interference-Muffle Furnace

These may include samples with tar as a matrix, vinyl asbestos tile, or any other organic that can be reduced by heating. Remove the sample from the vial and weigh in a balance to determine the weight of the submitted portion. Place the sample in a muffle furnace at 500 degrees C for 1 to 2 h or until all obvious organic material has been removed. Retrieve, cool and weigh again to determine the weight loss on ignition. This is necessary to determine the asbestos content of the submitted sample, because the analyst will be looking at a reduced sample.

Notes: Heating above 600 degrees C will cause the sample to undergo a structural change which, given sufficient time, will convert the chrysotile to forsterite. Heating even at lower temperatures for 1 to 2 h may have a measurable effect on the optical properties of the minerals. If the analyst is unsure of what to expect, a sample of standard asbestos should be heated to the same temperature for the same length of time so that it can be examined for the proper interpretation.

(iii) Samples With Organic Interference-THF

Vinyl asbestos tile is the most common material treated with this solvent, although, substances containing tar will sometimes yield to this treatment. Select a portion of the material and then grind it up if possible. Weigh the sample and place it in a test tube. Add sufficient THF to dissolve the organic matrix. This is usually about 4 to 5 mL. Remember, THF is highly flammable. Filter the remaining material through a tared silver membrane, dry and weigh to determine how much is left after the solvent extraction. Further process the sample to remove carbonate or mount directly.

(iv) Samples With Carbonate Interference

Carbonate material is often found on fibers and sometimes must be removed in order to perform dispersion microscopy. Weigh out a portion of the material and place it in a test tube. Add a sufficient amount of 0.1 M HCl or decalcifying solution in the tube to react all the carbonate as evidenced by gas formation; i.e., when the gas bubbles stop, add a little more solution. If no more gas forms, the reaction is complete. Filter the material out through a tared silver membrane, dry and weigh to determine the weight lost.

(d) Sample Preparation

Samples must be prepared so that accurate determination can be made of the asbestos type and amount present. The following steps are carried out in the low-flow hood (a low-flow hood has less than 50 fpm flow):

(i) If the sample has large lumps, is hard, or cannot be made to lie under a cover slip, the grain size must be reduced. Place a small amount between two slides and grind the material between them or grind a small amount in a clean mortar and pestle. The choice of whether to use an alumina, ruby, or diamond mortar depends on the hardness of the material. Impact damage can alter the asbestos mineral if too much mechanical shock occurs. (Freezer mills can completely destroy the observable crystallinity of

asbestos and should not be used). For some samples, a portion of material can be shaved off with a scalpel, ground off with a hand grinder or hacksaw blade.

The preparation tools should either be disposable or cleaned thoroughly. Use vigorous scrubbing to loosen the fibers during the washing. Rinse the implements with copious amounts of water and air-dry in a dust-free environment.

(ii) If the sample is powder or has been reduced as in (i) above, it is ready to mount. Place a glass slide on a piece of optical tissue and write the identification on the painted or frosted end. Place two drops of index of refraction medium $n=1.550$ on the slide. (The medium $n=1.550$ is chosen because it is the matching index for chrysotile.) Dip the end of a clean paper-clip or dissecting needle into the droplet of refraction medium on the slide to moisten it. Then dip the probe into the powder sample. Transfer what sticks on the probe to the slide. The material on the end of the probe should have a diameter of about 3 mm for a good mount. If the material is very fine, less sample may be appropriate. For nonpowder samples such as fiber mats, forceps should be used to transfer a small amount of material to the slide. Stir the material in the medium on the slide, spreading it out and making the preparation as uniform as possible. Place a cover-slip on the preparation by gently lowering onto the slide and allowing it to fall "trapdoor" fashion on the preparation to push out any bubbles. Press gently on the cover slip to even out the distribution of particulate on the slide. If there is insufficient mounting oil on the slide, one or two drops may be placed near the edge

of the coverslip on the slide. Capillary action will draw the necessary amount of liquid into the preparation. Remove excess oil with the point of a laboratory wiper.

Treat at least two different areas of each phase in this fashion. Choose representative areas of the sample. It may be useful to select particular areas or fibers for analysis. This is useful to identify asbestos in severely inhomogeneous samples.

When it is determined that amphiboles may be present, repeat the above process using the appropriate high-dispersion oils until an identification is made or all six asbestos minerals have been ruled out. Note that percent determination must be done in the index medium 1.550 because amphiboles tend to disappear in their matching mediums.

(e) Analytical procedure

Note: This method presumes some knowledge of mineralogy and optical petrography.

The analysis consists of three parts: The determination of whether there is asbestos present, what type is present and the determination of how much is present. The general flow of the analysis is:

(i) Gross examination.

(ii) Examination under polarized light on the stereo microscope.

(iii) Examination by phase-polar illumination on the compound phase microscope.

(iv) Determination of species by dispersion stain. Examination by Becke line analysis may also be used; however, this is usually more cumbersome for asbestos determination.

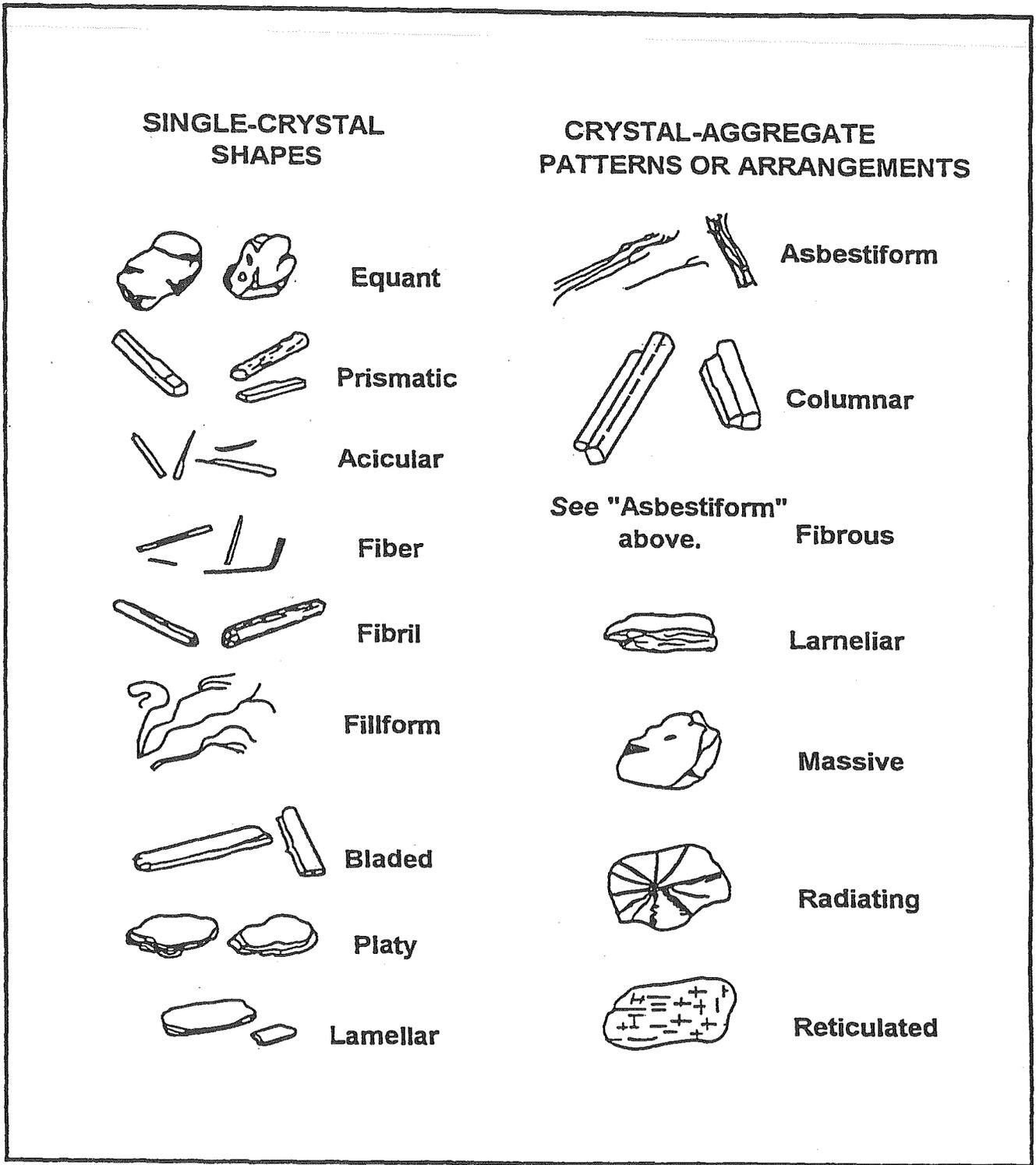


Figure 1. Particle definitions showing mineral growth habits.
From the U.S. Bureau of Mines.

(v) Difficult samples may need to be analyzed by SEM or TEM, or the results from those techniques combined with light microscopy for a definitive identification. Identification of a particle as asbestos requires that it be asbestiform. Description of particles should follow the suggestion of Campbell. (Figure 2)

For the purpose of regulation, the mineral must be one of the six minerals covered and must be in the asbestos growth habit. Large specimen samples of asbestos generally have the gross appearance of wood. Fibers are easily parted from it. Asbestos fibers are very long compared with their widths. The fibers have a very high tensile strength as demonstrated by bending without breaking. Asbestos fibers exist in bundles that are easily parted, show longitudinal fine structure and may be tufted at the ends showing "bundle of sticks" morphology. In the microscope some of these properties may not be observable. Amphiboles do not always show striations along their length even when they are asbestos. Neither will they always show tufting. They generally do not show a curved nature except for very long fibers. Asbestos and asbestiform minerals are usually characterized in groups by extremely high aspect ratios (greater than 100:1). While aspect ratio analysis is useful for characterizing populations of fibers, it cannot be used to identify individual fibers of intermediate to short aspect ratio. Observation of many fibers is often necessary to determine whether a sample consists of "cleavage fragments" or of asbestos fibers.

Most cleavage fragments of the asbestos minerals are easily distinguishable from true asbestos fibers. This is because true cleavage fragments usually have larger diameters than 1 micron. Internal structure of particles larger than this usually shows them to have no internal fibrillar structure. In addition, cleavage fragments of the monoclinic amphiboles show inclined extinction under crossed polars with no compensator. Asbestos fibers usually show extinction at zero degrees or ambiguous extinction if any at all. Morphologically, the larger cleavage fragments are obvious by their blunt or stepped ends showing prismatic habit. Also, they tend to be acicular rather than filiform.

Where the particles are less than 1 micron in diameter and have an aspect ratio greater than or equal to 3:1, it is recommended that the sample be analyzed by SEM or TEM if there is any question whether the fibers are cleavage fragments or asbestiform particles.

Care must be taken when analyzing by electron microscopy because the interferences are different from those in light microscopy and may structurally be very similar to asbestos. The classic interference is between anthophyllite and biopyribole or intermediate fiber. Use the same morphological clues for electron microscopy as are used for light microscopy, e.g. fibril splitting, internal longitudinal striation, fraying, curvature, etc.

(vi) Gross examination:

Examine the sample, preferably in the glass vial. Determine the presence of any obvious fibrous component. Estimate a percentage based on previous experience and current observation. Determine whether any pre-preparation is necessary. Determine the number of phases present. This step may be carried out or augmented by observation at 6x to 40x under a stereo microscope.

(vii) After performing any necessary pre-preparation, prepare slides of each phase as described above. Two preparations of the same phase in the same index medium can be made side-by-side on the same glass for convenience. Examine with the polarizing stereo microscope. Estimate the percentage of asbestos based on the amount of birefringent fiber present.

(viii) Examine the slides on the phase-polar microscopes at magnifications of 160x and 400x. Note the morphology of the fibers. Long, thin, very straight fibers with little curvature are indicative of fibers from the amphibole family. Curved, wavy fibers are usually indicative of chrysotile. Estimate the percentage of asbestos on the phase-polar microscope under conditions of crossed polars and a gypsum plate. Fibers smaller than 1.0 microns in thickness must be identified by inference to the presence of larger, identifiable fibers and morphology. If no larger fibers are visible, electron microscopy should be performed. At this point, only a tentative identification can be made. Full identification must be made with dispersion microscopy. Details of the tests are included in the appendices.

(ix) Once fibers have been determined to be present, they must be identified. Adjust the microscope for dispersion mode and observe the fibers. The microscope has a rotating stage, one polarizing element, and a system for generating dark-field dispersion microscopy (see subsection (4)(f) of this appendix). Align a fiber with its length parallel to the polarizer and note the color of the Becke lines. Rotate the stage to bring the fiber length perpendicular to the polarizer and note the color. Repeat this process for every fiber or fiber bundle examined. The colors must be consistent with the colors generated by standard asbestos reference materials for a positive identification. In $n=1.550$, amphiboles will generally show a yellow to straw-yellow color indicating that the fiber indices of refraction are higher than the liquid. If long, thin fibers are noted and the colors are yellow, prepare further slides as above in the suggested matching liquids listed below:

Type of asbestos	Index of refraction
Chrysotile	$n=1.550$.
Amosite	$n=1.670$ or 1.680 .
Crocidolite	$n=1.690$.
Anthophyllite	$n=1.605$ and 1.620 .
Tremolite	$n=1.605$ and 1.620 .
Actinolite	$n=1.620$.

Where more than one liquid is suggested, the first is preferred; however, in some cases this liquid will not give good dispersion color. Take care to avoid interferences in the other liquid; e.g., wollastonite in $n=1.620$ will give the same colors as tremolite. In $n=1.605$ wollastonite will appear yellow in all directions. Wollastonite may be determined under crossed polars as it will change from blue to yellow as it is rotated along its fiber axis by tapping on the cover slip. Asbestos minerals will not change in this way.

Determination of the angle of extinction may, when present, aid in the determination of anthophyllite from tremolite. True asbestos fibers usually have 0 degree

extinction or ambiguous extinction, while cleavage fragments have more definite extinction.

Continue analysis until both preparations have been examined and all present species of asbestos are identified. If there are no fibers present, or there is less than 0.1% present, end the analysis with the minimum number of slides (2).

(x) Some fibers have a coating on them which makes dispersion microscopy very difficult or impossible. Becke line analysis or electron microscopy may be performed in those cases. Determine the percentage by light microscopy. TEM analysis tends to overestimate the actual percentage present.

(xi) Percentage determination is an estimate of occluded area, tempered by gross observation. Gross observation information is used to make sure that the high magnification microscopy does not greatly over- or under-estimate the amount of fiber present. This part of the analysis requires a great deal of experience. Satisfactory models for asbestos content analysis have not yet been developed, although some models based on metallurgical grain-size determination have found some utility. Estimation is more easily handled in situations where the grain sizes visible at about 160x are about the same and the sample is relatively homogeneous.

View all of the area under the cover slip to make the percentage determination. View the fields while moving the stage, paying attention to the clumps of material. These are not usually the best areas to perform dispersion microscopy because of the interference from other materials. But, they are the areas most likely to represent the accurate percentage in the sample. Small amounts of asbestos require slower scanning and more frequent analysis of individual fields.

Report the area occluded by asbestos as the concentration. This estimate does not generally take into consideration the difference in density of the different species present in the sample. For most samples this is adequate. Simulation studies with similar materials must be carried out to apply microvisual estimation for that purpose and is beyond the scope of this procedure.

(xii) Where successive concentrations have been made by chemical or physical means, the amount reported is the percentage of the material in the "as submitted" or original state. The percentage determined by microscopy is multiplied by the fractions remaining after pre-preparation steps to give the percentage in the original sample. For example:

Step 1. 60% remains after heating at 550 degrees C for 1 h.

Step 2. 30% of the residue of step 1 remains after dissolution of carbonate in 0.1 m HCl.

Step 3. Microvisual estimation determines that 5% of the sample is chrysotile asbestos.

The reported result is:

$R = (\text{Microvisual result in percent}) \times (\text{Fraction remaining after step 2}) \times (\text{Fraction remaining of original sample after step 1})$

$$R = (5) \times (.30) \times (.60) = 0.9\%$$

(xiii) Report the percent and type of asbestos present. For samples where asbestos was identified, but is less than 1.0%, report "Asbestos present, less than 1.0%." There must have been at least two observed fibers or fiber bundles in the

two preparations to be reported as present. For samples where asbestos was not seen, report as "None Detected."

(4) Auxiliary Information

Because of the subjective nature of asbestos analysis, certain concepts and procedures need to be discussed in more depth. This information will help the analyst understand why some of the procedures are carried out the way they are.

(a) Light

Light is electromagnetic energy. It travels from its source in packets called quanta. It is instructive to consider light as a plane wave. The light has a direction of travel. Perpendicular to this and mutually perpendicular to each other, are two vector components. One is the magnetic vector and the other is the electric vector. We shall only be concerned with the electric vector. In this description, the interaction of the vector and the mineral will describe all the observable phenomena. From a light source such a microscope illuminator, light travels in all different direction from the filament.

In any given direction away from the filament, the electric vector is perpendicular to the direction of travel of a light ray. While perpendicular, its orientation is random about the travel axis. If the electric vectors from all the light rays were lined up by passing the light through a filter that would only let light rays with electric vectors oriented in one direction pass, the light would then be POLARIZED.

Polarized light interacts with matter in the direction of the electric vector. This is the polarization direction. Using this property it is possible to use polarized light to probe different materials and identify them by how they interact with light. The speed of light in a vacuum is a constant at about 2.99×10^8 m/s. When light travels in different materials such as air, water, minerals or oil, it does not travel at this speed. It travels slower. This slowing is a function of both the material through which the light is traveling and the wavelength or frequency of the light. In general, the more dense the material, the slower the light travels. Also, generally, the higher the frequency, the slower the light will travel. The ratio of the speed of light in a vacuum to that in a material is called the index of refraction (n). It is usually measured at 589 nm (the sodium D line). If white light (light containing all the visible wavelengths) travels through a material, rays of longer wavelengths will travel faster than those of shorter wavelengths, this separation is called dispersion. Dispersion is used as an identifier of materials as described in Section (4)(f).

(b) Material Properties

Materials are either amorphous or crystalline. The difference between these two descriptions depends on the positions of the atoms in them. The atoms in amorphous materials are randomly arranged with no long range order. An example of an amorphous material is glass. The atoms in crystalline materials, on the other hand, are in regular arrays and have long range order. Most of the atoms can be found in highly predictable locations. Examples of crystalline material are salt, gold, and the asbestos minerals.

It is beyond the scope of this method to describe the different types of crystalline materials that can be found, or the full description of the classes into which they can fall.

However, some general crystallography is provided below to give a foundation to the procedures described.

With the exception of anthophyllite, all the asbestos minerals belong to the monoclinic crystal type. The unit cell is the basic repeating unit of the crystal and for monoclinic crystals can be described as having three unequal sides, two 90 degrees angles and one angle not equal to 90 degrees. The orthorhombic group, of which anthophyllite is a member has three unequal sides and three 90 degrees angles. The unequal sides are a consequence of the complexity of fitting the different atoms into the unit cell. Although the atoms are in a regular array, that array is not symmetrical in all directions. There is long range order in the three major directions of the crystal. However, the order is different in each of the three directions. This has the effect that the index of refraction is different in each of the three directions. Using polarized light, we can investigate the index of refraction in each of the directions and identify the mineral or material under investigation. The indices alpha, beta, and gamma are used to identify the lowest, middle, and highest index of refraction respectively. The x direction, associated with alpha is called the fast axis. Conversely, the z direction is associated with gamma and is the slow direction. Crocidolite has alpha along the fiber length making it "length-fast." The remainder of the asbestos minerals have the gamma axis along the fiber length. They are called "length-slow." This orientation to fiber length is used to aid in the identification of asbestos.

(c) Polarized Light Technique

Polarized light microscopy as described in this section uses the phase-polar microscope described in Section (3)(b). A phase contrast microscope is fitted with two polarizing elements, one below and one above the sample. The polarizers have their polarization directions at right angles to each other. Depending on the tests performed, there may be a compensator between these two polarizing elements. Light emerging from a polarizing element has its electric vector pointing in the polarization direction of the element. The light will not be subsequently transmitted through a second element set at a right angle to the first element. Unless the light is altered as it passes from one element to the other, there is no transmission of light.

(d) Angle of Extinction

Crystals which have different crystal regularity in two or three main directions are said to be anisotropic. They have a different index of refraction in each of the main directions. When such a crystal is inserted between the crossed polars, the field of view is no longer dark but shows the crystal in color. The color depends on the properties of the crystal. The light acts as if it travels through the crystal along the optical axes. If a crystal optical axis were lined up along one of the polarizing directions (either the polarizer or the analyzer) the light would appear to travel only in that direction, and it would blink out or go dark. The difference in degrees between the fiber direction and the angle at which it blinks out is called the angle of extinction. When this angle can be measured, it is useful in identifying the mineral. The procedure for measuring the angle of extinction is to first identify the polarization direction in the microscope. A commercial alignment slide can be used to establish the polarization directions or use anthophyllite or another

suitable mineral. This mineral has a zero degree angle of extinction and will go dark to extinction as it aligns with the polarization directions. When a fiber of anthophyllite has gone to extinction, align the eyepiece reticle or graticule with the fiber so that there is a visual cue as to the direction of polarization in the field of view. Tape or otherwise secure the eyepiece in this position so it will not shift.

After the polarization direction has been identified in the field of view, move the particle of interest to the center of the field of view and align it with the polarization direction. For fibers, align the fiber along this direction. Note the angular reading of the rotating stage. Looking at the particle, rotate the stage until the fiber goes dark or "blinks out." Again note the reading of the stage. The difference in the first reading and the second is an angle of extinction.

The angle measured may vary as the orientation of the fiber changes about its long axis. Tables of mineralogical data usually report the maximum angle of extinction. Asbestos forming minerals, when they exhibit an angle of extinction, usually do show an angle of extinction close to the reported maximum, or as appropriate depending on the substitution chemistry.

(e) Crossed Polars With Compensator

When the optical axes of a crystal are not lined up along one of the polarizing directions (either the polarizer or the analyzer) part of the light travels along one axis and part travels along the other visible axis. This is characteristic of birefringent materials.

The color depends on the difference of the two visible indices of refraction and the thickness of the crystal. The maximum difference available is the difference between the alpha and the gamma axes. This maximum difference is usually tabulated as the birefringence of the crystal.

For this test, align the fiber at 45 degrees to the polarization directions in order to maximize the contribution to each of the optical axes. The colors seen are called retardation colors. They arise from the recombination of light which has traveled through the two separate directions of the crystal. One of the rays is retarded behind the other since the light in that direction travels slower. On recombination, some of the colors which make up white light are enhanced by constructive interference and some are suppressed by destructive interference. The result is a color dependent on the difference between the indices and the thickness of the crystal. The proper colors, thicknesses, and retardations are shown on a Michel-Levy chart. The three items, retardation, thickness and birefringence are related by the following relationship: Λ

$$R = t(n_{\gamma} - \alpha)$$

R = retardation, t = crystal thickness in micron, and alpha, gamma = indices of refraction.

Examination of the equation for asbestos minerals reveals that the visible colors for almost all common asbestos minerals and fiber sizes are shades of gray and

black. The eye is relatively poor at discriminating different shades of gray. It is very good at discriminating different colors. In order to compensate for the low retardation, a compensator is added to the light train between the polarization elements. The compensator used for this test is a gypsum plate of known thickness and birefringence. Such a compensator when oriented at 45 degrees to the polarizer direction, provides a retardation of 530 nm of the 530 nm wavelength color. This enhances the red color and gives the background a characteristic red to red-magenta color. If this "full-wave" compensator is in place when the asbestos preparation is inserted into the light train, the colors seen on the fibers are quite different. Gypsum, like asbestos has a fast axis and a slow axis. When a fiber is aligned with its fast axis in the same direction as the fast axis of the gypsum plate, the ray vibrating in the slow direction is retarded by both the asbestos and the gypsum. This results in a higher retardation than would be present for either of the two minerals. The color seen is a second order blue. When the fiber is rotated 90 degrees using the rotating stage, the slow direction of the fiber is now aligned with the fast direction of the gypsum and the fast direction of the fiber is aligned with the slow direction of the gypsum. Thus, one ray vibrates faster in the fast direction of the gypsum, and slower in the slow direction of the fiber; the other ray will vibrate slower in the slow direction of the gypsum and faster in the fast direction of the fiber. In this case, the effect is subtractive and the color seen is a first order yellow. As long as the fiber thickness does not add appreciably to the color, the same basic colors will be seen for all asbestos types except crocidolite. In crocidolite the colors will be weaker, may be in the opposite directions, and will be altered by the blue absorption color natural to crocidolite. Hundreds of other materials will give the same colors as asbestos, and therefore, this test is not definitive for asbestos. The test is useful in discriminating against fiberglass or other amorphous fibers such as some synthetic fibers. Certain synthetic fibers will show retardation colors different than asbestos; however, there are some forms of polyethylene and aramid which will show morphology and retardation colors similar to asbestos minerals. This test must be supplemented with a positive identification test when birefringent fibers are present which can not be excluded by morphology. This test is relatively ineffective for use on fibers less than 1 micron in diameter. For positive confirmation TEM or SEM should be used if no larger bundles or fibers are visible.

(f) Dispersion Staining

Dispersion microscopy or dispersion staining is the method of choice for the identification of asbestos in bulk materials. Becke line analysis is used by some laboratories and yields the same results as does dispersion staining for asbestos and can be used in lieu of dispersion staining. Dispersion staining is performed on the same platform as the phase-polar analysis with the analyzer and compensator removed. One polarizing element remains to define the direction of the light so that the different indices of refraction of the fibers may be separately determined. Dispersion microscopy is a dark-field technique when used for asbestos. Particles are imaged with scattered light. Light which is unscattered is blocked from reaching the eye either by the back field image mask in a McCrone objective or a back

field image mask in the phase condenser. The most convenient method is to use the rotating phase condenser to move an oversized phase ring into place. The ideal size for this ring is for the central disk to be just larger than the objective entry aperture as viewed in the back focal plane. The larger the disk, the less scattered light reaches the eye. This will have the effect of diminishing the intensity of dispersion color and will shift the actual color seen. The colors seen vary even on microscopes from the same manufacturer. This is due to the different bands of wavelength exclusion by different mask sizes. The mask may either reside in the condenser or in the objective back focal plane. It is imperative that the analyst determine by experimentation with asbestos standards what the appropriate colors should be for each asbestos type. The colors depend also on the temperature of the preparation and the exact chemistry of the asbestos. Therefore, some slight differences from the standards should be allowed. This is not a serious problem for commercial asbestos uses. This technique is used for identification of the indices of refraction for fibers by recognition of color. There is no direct numerical readout of the index of refraction. Correlation of color to actual index of refraction is possible by referral to published conversion tables. This is not necessary for the analysis of asbestos. Recognition of appropriate colors along with the proper morphology are deemed sufficient to identify the commercial asbestos minerals. Other techniques including SEM, TEM, and XRD may be required to provide additional information in order to identify other types of asbestos.

Make a preparation in the suspected matching high dispersion oil, e.g., $n=1.550$ for chrysotile. Perform the preliminary tests to determine whether the fibers are birefringent or not. Take note of the morphological character. Wavy fibers are indicative of chrysotile while long, straight, thin, frayed fibers are indicative of amphibole asbestos. This can aid in the selection of the appropriate matching oil. The microscope is set up and the polarization direction is noted as in Section (4)(d). Align a fiber with the polarization direction. Note the color. This is the color parallel to the polarizer. Then rotate the fiber rotating the stage 90 degrees so that the polarization direction is across the fiber. This is the perpendicular position. Again note the color. Both colors must be consistent with standard asbestos minerals in the correct direction for a positive identification of asbestos. If only one of the colors is correct while the other is not, the identification is not positive. If the colors in both directions are bluish-white, the analyst has chosen a matching index oil which is higher than the correct matching oil, e.g. the analyst has used $n = 1.620$ where chrysotile is present. The next lower oil (Section (3)(e)) should be used to prepare another specimen. If the color in both directions is yellow-white to straw-yellow-white, this indicates that the index of the oil is lower than the index of the fiber, e.g. the preparation is in $n = 1.550$ while anthophyllite is present. Select the next higher oil (Section (3)(e)) and prepare another slide. Continue in this fashion until a positive identification of all asbestos species present has been made or all possible asbestos species have been ruled out by negative results in this test. Certain plant fibers can have similar dispersion colors as asbestos. Take care to note and evaluate the morphology of the fibers or remove the plant fibers in pre-

preparation. Coating material on the fibers such as carbonate or vinyl may destroy the dispersion color. Usually, there will be some outcropping of fiber which will show the colors sufficient for identification. When this is not the case, treat the sample as described in Section (3)(c) and then perform dispersion staining. Some samples will yield to Becke line analysis if they are coated or electron microscopy can be used for identification.

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WAC 296-62-07755 Appendix K—Smoking cessation program information for asbestos, tremolite, anthophyllite, and actinolite—Nonmandatory. The following organizations provide smoking cessation information and program material:

(1) The National Cancer Institute operates a toll-free Cancer Information Service (CIS) with trained personnel to help you. Call 1-800-4-CANCER* to reach the CIS office serving your area, or write: Office of Cancer Communications, National Cancer Institute, National Institutes of Health, Building 31, Room 10A24, Bethesda, Maryland 20892.

(2) American Cancer Society, 3340 Peachtree Road, N.E., Atlanta, Georgia 30062, (404) 320-3333. The American Cancer Society (ACS) is a voluntary organization composed of 58 divisions and 3,100 local units. Through "The Great American Smokeout" in November, the annual Cancer Crusade in April, and numerous educational materials, ACS helps people learn about the health hazards of smoking and become successful ex-smokers.

(3) American Heart Association, 7320 Greenville Avenue, Dallas, Texas 75231, (214) 750-5300. The American Heart Association (AHA) is a voluntary organization with 130,000 members (physicians, scientists, and laypersons) in 55 states and regional groups. AHA produces a variety of publications and audiovisual materials about the effects of smoking on the heart. AHA also has developed a guidebook for incorporating a weight-control component into smoking cessation programs.

(4) American Lung Association, 1740 Broadway, New York, New York 10019, (212) 245-8000. A voluntary organization of 7,500 members (physicians, nurses, and laypersons), the American Lung Association (ALA) conducts numerous public information programs about the health effect of smoking. ALA has 59 state and 85 local units. The organization actively supports legislation and information campaigns for nonsmokers' rights and provides help for smokers who want to quit, for example, through "Freedom From Smoking," a self-help smoking cessation program.

(5) Office on Smoking and Health, United States Department of Health and Human Services, 5600 Fishers Lane, Park Building, Room 110, Rockville, Maryland 20857. The Office on Smoking and Health (OSH) is the Department of Health and Human Services' lead agency in smoking control. OSH has sponsored distribution of publications on

smoking-related topics, such as free flyers on relapse after initial quitting, helping a friend or family member quit smoking, the health hazards of smoking, and the effects of parental smoking on teenagers.

*In Hawaii, on Oahu call 524-1234 (call collect from neighboring islands), Spanish-speaking staff members are available during daytime hours to callers from the following areas: California, Florida, Georgia, Illinois, New Jersey (area code 210), New York, and Texas. Consult your local telephone directory for listings of local chapters.

[Statutory Authority: Chapter 49.17 RCW. 91-03-044 (Order 90-18), § 296-62-07755, filed 1/10/91, effective 2/12/91.]

WAC 296-62-07761 Nonasbestiform tremolite, anthophyllite, and actinolite. (1) Definitions. For the purpose of this section:

(a) "Department" means the department of labor and industries.

(b) "Director" means the director of the department of labor and industries or his/her authorized representatives.

(c) "Employee exposure" means that exposure to airborne tremolite, anthophyllite, actinolite, or a combination of these minerals that would occur if the employee were not using respiratory protective equipment.

(d) "Fiber" means a particulate form of tremolite, anthophyllite, or actinolite, five micrometers or longer, with a length-to-diameter ratio of at least three to one.

(e) "Tremolite, anthophyllite, or actinolite" means the nonasbestos form of these minerals, and any of these minerals that have been chemically treated and/or altered.

(2) Permissible exposure to airborne concentrations of tremolite, anthophyllite, and actinolite fibers including any combination of these minerals.

(a) The eight-hour time-weighted average airborne concentration of tremolite, anthophyllite, and actinolite fibers to which any employee may be exposed shall not exceed two fibers per cubic centimeter of air, as determined by the method prescribed in subsection (5) of this section.

(b) Ceiling concentration. No employee shall be exposed at any time to an airborne concentration of tremolite, anthophyllite, and actinolite fibers in excess of ten fibers per cubic centimeter of air, as determined by the method prescribed in subsection (5) of this section.

(3) Methods of compliance.

(a) Engineering methods.

(i) Engineering controls. Engineering controls, such as, but not limited to, isolation, enclosure, exhaust ventilation, and dust collection, shall be used to meet the exposure limits prescribed in subsection (2) of this section.

(ii) Local exhaust ventilation. Local exhaust ventilation and dust collection systems shall be designed, constructed, installed, and maintained in accordance with the American National Standard Fundamentals Governing the Design and Operation of Local Exhaust Systems, ANSI Z9.2-1971, which is incorporated by reference herein.

(iii) Particular tools. All hand-operated and power-operated tools which may produce or release tremolite, anthophyllite, and actinolite fibers in excess of the exposure limits prescribed in subsection (2) of this section, such as, but not limited to, saws, scorers, abrasive wheels, and drills,

shall be provided with local exhaust ventilation systems in accordance with (a)(ii) of this subsection.

(b) Work practices.

(i) Wet methods. Insofar as practicable, tremolite, anthophyllite, and actinolite shall be handled, mixed, applied, removed, cut, scored, or otherwise worked in a wet state sufficient to prevent the emission of airborne fibers in excess of the exposure limits prescribed in subsection (2) of this section, unless the usefulness of the product would be diminished thereby.

(ii) Particular products and operations. No tremolite, anthophyllite, and actinolite cement, mortar, coating, grout, plaster, or similar material containing tremolite, anthophyllite, and actinolite shall be removed from bags, cartons, or other containers in which they are shipped, without being either wetted, or enclosed, or ventilated so as to prevent effectively the release of airborne tremolite, anthophyllite, and actinolite fibers in excess of the limits prescribed in subsection (2) of this section.

(iii) Spraying, demolition, or removal. Employees engaged in the spraying of tremolite, anthophyllite, and actinolite, the removal, or demolition of pipes, structures, or equipment covered or insulated with tremolite, anthophyllite, and actinolite, and in the removal or demolition of tremolite, anthophyllite, and actinolite insulation or coverings shall be provided with Type "C" supplied air respiratory equipment and with special clothing in accordance with subsection (4)(c) of this section.

(4) Personal protective equipment.

(a) Compliance with the exposure limits prescribed by subsection (2) of this section may not be achieved by the use of respirators or shift rotation of employees except:

(i) During the time period necessary to install the engineering controls and to institute the work practices required by subsection (3) of this section.

(ii) In work situations in which the methods prescribed in subsection (3) of this section are either technically not feasible or feasible to an extent insufficient to reduce the airborne concentration of tremolite, anthophyllite, and actinolite fibers below the limits prescribed by subsection (2) of this section; or

(iii) In emergencies.

(iv) Where both respirators and personnel rotation are allowed by (a)(i), (ii), or (iii) of this subsection, and both are practicable, personnel rotation shall be preferred and used.

(b) Where a respirator is permitted by (a)(i), (ii), or (iii) of this subsection, it shall comply with the applicable provisions of WAC 296-62-071.

(i) Respirator selection. The employer shall select, provide, and ensure the use of respirators, at no cost to the employees, in accordance with the respirator protection factors listed in Table 1 of this section.

(ii) Establishment of a respirator program.

(A) The employer shall establish a respirator program in accordance with the requirements of chapter 296-62 WAC.

(B) No employee shall be assigned to tasks requiring the use of respirators if, based upon his most recent examination, an examining physician determines that the employee will be unable to function normally wearing a respirator, or that the safety or health of the employee or other employees will be impaired by his/her use of a respirator. Such employee shall

be rotated to another job or given the opportunity to transfer to a different position whose duties he/she is able to perform with the same employer, in the same geographical area and with the same seniority, status, and rate of pay he/she had just prior to such transfer, if such a different position is available.

(c) Special clothing: The employer shall provide at no cost, and require the use of, special clothing, such as coveralls or similar whole body clothing, head coverings, gloves, and foot coverings for any employee exposed to an airborne concentration of tremolite, anthophyllite, and actinolite fibers, which exceeds 2 f/cc.

(d) Change rooms:

(i) At any place of employment exposed to an airborne concentration of tremolite, anthophyllite, and actinolite fibers in excess of the exposure limits prescribed in subsection (2) of this section, the employer shall provide change rooms for employees.

(ii) Clothes lockers: The employer shall provide two separate lockers or containers for each employee, so separated or isolated as to prevent contamination of the employee's street clothes from his/her work clothes.

(iii) Laundering:

(A) Laundering of tremolite, anthophyllite, and actinolite contaminated clothing shall be done so as to prevent the release of airborne fibers in excess of the exposure limits prescribed in subsection (2) of this section.

(B) Any employer who gives contaminated clothing to another person for laundering shall inform such person of the requirement in (d) of this subsection to effectively prevent the release of airborne tremolite, anthophyllite, and actinolite fibers in excess of the exposure limits prescribed in subsection (2) of this section.

(C) Contaminated clothing shall be transported in sealed impermeable bags, or other closed, impermeable containers, and labeled in accordance with subsection (7)(b) of this section.

(5) Method of measurement. All determinations of airborne concentrations of tremolite, anthophyllite, and actinolite fibers shall be made by the membrane filter method at 400-450 X (magnification) four millimeter objective with phase contrast illumination.

(6) Monitoring.

(a) Initial determinations. Every employer shall cause every place of employment where tremolite, anthophyllite, and actinolite fibers are released to be monitored in such a way as to determine whether every employee's exposure to tremolite, anthophyllite, and actinolite fibers is below the limits prescribed in subsection (2) of this section. If the limits are exceeded, the employer shall immediately undertake a compliance program in accordance with subsection (3) of this section.

(b) Personal monitoring.

(i) Samples shall be collected from within the breathing zone of the employees, on membrane filters of 0.8 micrometer porosity mounted in an open-face filter holder. Samples shall be taken for the determination of the eight-hour time-weighted average airborne concentration and of the ceiling concentration of tremolite, anthophyllite, and actinolite fibers.

(ii) Sampling frequency and patterns. After the initial determinations required by (a) of this subsection, samples shall be of such frequency and pattern as to represent with reasonable accuracy the levels of exposure of employees. In no case shall the sampling be done at intervals greater than six months for employees whose exposure to tremolite, anthophyllite, and actinolite may reasonably be foreseen to exceed the limits prescribed by subsection (2) of this section.

(c) Environmental monitoring.

(i) Samples shall be collected from areas of a work environment which are representative of the airborne concentration of tremolite, anthophyllite, and actinolite fibers which may reach the breathing zone of employees. Samples shall be collected on a membrane filter of 0.8 micrometer porosity mounted in an open-face filter holder. Samples shall be taken for the determination of the eight-hour time-weighted average airborne concentration and of the ceiling concentration of tremolite, anthophyllite, and actinolite fibers.

(ii) Sampling frequency and patterns. After the initial determinations required by (a) of this subsection, samples shall be of such frequency and pattern as to represent with reasonable accuracy the levels of exposure of the employees. In no case shall sampling be at intervals greater than six months for employees whose exposures to tremolite, anthophyllite, and actinolite may reasonably be foreseen to exceed the exposure limits prescribed in subsection (2) of this section.

(d) Employee observation of monitoring. Affected employees, or their representatives, shall be given a reasonable opportunity to observe any monitoring required by this subsection and shall have access to the records thereof.

(7) Caution signs and labels.

(a) Caution signs.

(i) Posting. Caution signs shall be provided and displayed at each location where airborne concentrations of tremolite, anthophyllite, and actinolite fibers are reasonably expected to be released or where airborne concentrations of tremolite, anthophyllite, and actinolite fibers may be in excess of the exposure limits prescribed in subsection (2) of this section. Signs shall be posted at such a distance from such a location so that an employee may read the signs and take necessary protective steps before entering the area marked by the signs. Signs shall be posted at all approaches to areas containing airborne tremolite, anthophyllite, and actinolite fibers.

(ii) Sign specifications. The warning signs required by (a)(i) of this subsection shall conform to the requirements of 20" X 14" vertical format signs specified in WAC 296-24-14007(4) and to this subsection. The signs shall display the following legend in the lower panel, with letter sizes and styles of a visibility at least equal to that specified in this subdivision.

Legend	Notation
Tremolite, anthophyllite, and actinolite _____	1" Sans Serif, Gothic or Block.
Dust hazard _____	3/4" Sans Serif, Gothic or Block.
Avoid breathing dust _____	1/4" Gothic.
Wear assigned protective equipment _____	1/4" Gothic.

Do not remain in area unless your work requires it _____ 1/4" Gothic.

Breathing tremolite, anthophyllite, and actinolite fibers may be hazardous to your health _____ 14 point Gothic.

Spacing between lines shall be at least equal to the height of the upper of any two lines.

(b) Caution labels.

(i) Labeling. Caution labels shall be affixed to all raw materials, mixtures, scrap, waste, debris, and other products containing tremolite, anthophyllite, and actinolite fibers, or to their containers, except that no label is required where fibers have been modified by a bonding agent, coating, binder, or other material so that during any reasonably foreseeable use, handling, storage, disposal, processing, or transportation, no airborne fibers will be released.

(ii) Label specifications. The caution labels required by (b)(i) of this subsection shall be printed in letters of sufficient size and contrast as to be readily visible and legible. The label shall state:

CAUTION

Contains Tremolite, Anthophyllite, or Actinolite Fibers

Avoid Creating Dust

Breathing Tremolite, Anthophyllite, or Actinolite Fibers
May Cause

Serious Bodily Harm

(8) Housekeeping.

(a) Cleaning. All external surfaces in any place of employment shall be maintained free of accumulations of tremolite, anthophyllite, and actinolite fibers.

(b) Waste disposal. Tremolite, anthophyllite, and actinolite waste, scrap, debris, bags, containers, equipment, and contaminated clothing, consigned for disposal, shall be collected and disposed of in sealed impermeable bags at least 6 mils in thickness, or other closed, impermeable containers.

(c) Deterioration. Friable tremolite, anthophyllite, or actinolite and friable tremolite, anthophyllite, or actinolite containing material which has become damaged or deteriorated shall be repaired, enclosed, encapsulated, or removed.

(9) Recordkeeping.

(a) Exposure records. Every employer shall maintain records of any personal or environmental monitoring required by subsection (6) of this section. Records shall be maintained for a period of at least thirty years and shall be made available upon request to the director of the department of labor and industries.

(b) Access. Employee exposure records required by this subsection shall be provided upon request to employees, designated representatives, and the assistant director in accordance with WAC 296-62-05201 through 296-62-05209 and WAC 296-62-05213 through 296-62-05217.

(c) Employee notification. Any employee found to have been exposed at any time to an airborne concentration of tremolite, anthophyllite, or actinolite fibers in excess of the limits prescribed in subsection (2) of this section shall be notified in writing of the exposure as soon as practicable but not later than five days of the finding. The employee shall also be timely notified of the corrective action being taken.

(10) Medical examinations.

(a) General. The employer shall provide or make available at his/her cost, medical examinations relative to exposure to tremolite, anthophyllite, or actinolite required by this section.

(b) Preplacement. The employer shall provide or make available to each of his/her employees, within thirty calendar days following his/her first employment in an occupation exposed to an airborne concentration of tremolite, anthophyllite, or actinolite fibers, a comprehensive medical examination, which shall include, as a minimum, a chest roentgenogram (posterior-anterior fourteen by seventeen inches), a history to elicit symptomatology of respiratory disease, and pulmonary function tests to include forced vital capacity (FVC) and forced expiratory volume at one second (FEV_{1,0}).

(c) Annual examinations. Every employer shall provide or make available on an annual basis, comprehensive medical examinations to each of his/her employees engaged in occupations exposed to airborne concentrations of tremolite, anthophyllite, and actinolite fibers. Such annual examination shall include, as a minimum, a chest roentgenogram (posterior-anterior fourteen by seventeen inches), a history to elicit symptomatology of respiratory disease, and pulmonary function tests to include forced vital capacity (FVC) and forced expiratory volume at one second (FEV_{1,0}).

(d) Termination of employment. The employer shall provide, or make available, within thirty calendar days before or after the termination of employment of any employee engaged in an occupation exposed to an airborne concentration of tremolite, anthophyllite, or actinolite fibers, a comprehensive medical examination which shall include, as a minimum, a chest roentgenogram (posterior-anterior fourteen by seventeen inches), a history to elicit symptomatology of respiratory disease, and pulmonary function tests to include forced vital capacity (FVC) and forced expiratory volume at one second (FEV_{1,0}).

(e) Recent examinations. No medical examination is required of any employee, if adequate records show that the employee has been examined in accordance with this subsection within the past one-year period.

(f) Medical records.

(i) Maintenance. Employers of employees examined pursuant to this subsection shall cause to be maintained complete and accurate records of all such medical examinations. Records shall be retained by employers for at least thirty years.

(ii) Access. Records of the medical examinations required by this subsection shall be provided upon request to employees, designated representative and the assistant director in accordance with WAC 296-62-05201 through 296-62-05209 and WAC 296-62-05213 through 296-62-05217. These records shall also be provided upon request to the director of the department of labor and industries. Any physician who conducts a medical examination required by this subsection shall furnish to the employer of the examined employee all the information specifically required by this subsection, and any other medical information related to occupational exposure to tremolite, anthophyllite, and actinolite fibers.

TABLE 1—RESPIRATORY PROTECTION FOR TREMOLITE, Anthophyllite, AND ACTINOLITE FIBERS

CONCENTRATION OF TREMOLITE, Anthophyllite, ACTINOLITE, OR A COMBINATION OF THESE MINERALS	Required RESPIRATOR ^a
Not in excess of 2 f/cc.	1. Half-mask, air-purifying respirator equipped with high-efficiency cartridge filters. ^b
Not in excess of 10 f/cc.	1. Full facepiece air-purifying respirator equipped with high-efficiency filters.
Not in excess of 20 f/cc	1. Any powered air-purifying respirator equipped with high-efficiency filters. 2. Any supplied-air respirator operated in continuous flow mode.
Not in excess of 200 f/cc.	1. Full facepiece supplied-air respirator operated in pressure demand mode.
Greater than 200 f/cc	1. Full facepiece supplied-air or unknown concentration, respirator operated in pressure-demand mode equipped with either an auxiliary positive pressure self-contained breathing apparatus or a HEPA filter. 2. Full facepiece positive-pressure self-contained breathing apparatus (SCBA).

Note: a. Respirators assigned for higher environmental concentrations may be used at lower concentrations.

b. A high-efficiency filter means a filter that is capable of trapping and retaining at least 99.97 percent of all nondispersed particles of 0.3 micrometers mean aerodynamic diameter or larger.

[Statutory Authority: Chapter 49.17 RCW. 87-24-051 (Order 87-24), § 296-62-07761, filed 11/30/87.]

PART J—BIOLOGICAL AGENTS

WAC 296-62-080 Biological agents. (1) Definition. Biological agents are organisms or their by-products.

(2) Protection from exposure. Workmen shall be protected from exposure to hazardous concentrations of biological agents which may arise from processing, handling or using materials or waste.

[Order 73-3, § 296-62-080, filed 5/7/73; Order 70-8, § 296-62-080, filed 7/31/70, effective 9/1/70; Rule 8.010, effective 8/1/63.]

WAC 296-62-08001 Bloodborne pathogens. (1) Scope and application. This section applies to all occupational exposure to blood or other potentially infectious materials as defined by subsection (2) of this section.

(2) Definitions. For purposes of this section, the following shall apply:

"Blood" means human blood, human blood components, and products made from human blood.

"Bloodborne pathogens" means pathogenic microorganisms that are present in human blood and can cause disease

in humans. These pathogens include, but are not limited to, hepatitis B virus (HBV) and human immunodeficiency virus (HIV).

"Clinical laboratory" means a workplace where diagnostic or other screening procedures are performed on blood or other potentially infectious materials.

"Contaminated" means the presence or the reasonably anticipated presence of blood or other potentially infectious materials on an item or surface.

"Contaminated laundry" means laundry which has been soiled with blood or other potentially infectious materials or may contain contaminated sharps.

"Contaminated sharps" means any contaminated object that can penetrate the skin including, but not limited to, needles, scalpels, broken glass, broken capillary tubes, and exposed ends of dental wires.

"Decontamination" means the use of physical or chemical means to remove, inactivate, or destroy bloodborne pathogens on a surface or item to the point where they are no longer capable of transmitting infectious particles and the surface or item is rendered safe for handling, use, or disposal.

"Director" means the director of the Washington state department of labor and industries; the state designee for the Washington state plan.

"Engineering controls" means controls (e.g., sharps disposal containers, self-sheathing needles) that isolate or remove the bloodborne pathogens hazard from the workplace.

"Exposure incident" means a specific eye, mouth, other mucous membrane, nonintact skin, or parenteral contact with blood or other potentially infectious materials that results from the performance of an employee's duties.

"Handwashing facilities" means a facility providing an adequate supply of running potable water, soap and single use towels or hot air drying machines.

"Licensed healthcare professional" is a person whose legally permitted scope of practice allows him or her to independently perform the activities required by subsection (6) of this section, entitled Hepatitis B vaccination and post-exposure evaluation and follow-up.

"HBV" means hepatitis B virus.

"HIV" means human immunodeficiency virus.

"Occupational exposure" means reasonably anticipated skin, eye, mucous membrane, or parenteral contact with blood or other potentially infectious materials that may result from the performance of an employee's duties.

"Other potentially infectious materials" means:

(a) The following human body fluids: Semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, saliva in dental procedures, any body fluid that is visibly contaminated with blood, and all body fluids in situations where it is difficult or impossible to differentiate between body fluids;

(b) Any unfixed tissue or organ (other than intact skin) from a human (living or dead); and

(c) HIV-containing cell or tissue cultures, organ cultures, and HIV- or HBV-containing culture medium or other solutions; and blood, organs, or other tissues from experimental animals infected with HIV or HBV.

"Parenteral" means piercing mucous membranes or the skin barrier through such events as needlesticks, human bites, cuts, and abrasions.

"Personal protective equipment" is specialized clothing or equipment worn by an employee for protection against a hazard. General work clothes (e.g., uniforms, pants, shirts, or blouses) not intended to function as protection against a hazard are not considered to be personal protective equipment.

"Production facility" means a facility engaged in industrial-scale, large-volume or high concentration production of HIV or HBV.

"Regulated waste" means liquid or semi-liquid blood or other potentially infectious materials; contaminated items that would release blood or other potentially infectious materials in a liquid or semi-liquid state if compressed; items that are caked with dried blood or other potentially infectious materials and are capable of releasing these materials during handling; contaminated sharps; and pathological and microbiological wastes containing blood or other potentially infectious materials.

"Research laboratory" means a laboratory producing or using research-laboratory-scale amounts of HIV or HBV. Research laboratories may produce high concentrations of HIV or HBV but not in the volume found in production facilities.

"Source individual" means any individual, living or dead, whose blood or other potentially infectious materials may be a source of occupational exposure to the employee. Examples include, but are not limited to, hospital and clinic patients; clients in institutions for the developmentally disabled; trauma victims; clients of drug and alcohol treatment facilities; residents of hospices and nursing homes; human remains; and individuals who donate or sell blood or blood components.

"Sterilize" means the use of a physical or chemical procedure to destroy all microbial life including highly resistant bacterial endospores.

"Universal precautions" are an approach to infection control. According to the concept of universal precautions, all human blood and certain human body fluids are treated as if known to be infectious for HIV, HBV, and other bloodborne pathogens.

"Work practice controls" means controls that reduce the likelihood of exposure by altering the manner in which a task is performed (e.g., prohibiting recapping of needles by a two-handed technique).

(3) Exposure control.

(a) Exposure control plan.

(i) Each employer having an employee(s) with occupational exposure as defined by subsection (2) of this section shall establish a written exposure control plan designed to eliminate or minimize employee exposure.

(ii) The exposure control plan shall contain at least the following elements:

(A) The exposure determination required by (b) of this subsection;

(B) The schedule and method of implementation for subsection (4) of this section, Methods of compliance; subsection (5) of this section, HIV and HBV research laboratories and production facilities; subsection (6) of this

section, Hepatitis B vaccination and post-exposure evaluation and follow-up; subsection (7) of this section, Communication of hazards to employees; and subsection (8) of this section, Recordkeeping; and

(C) The procedure for the evaluation of circumstances surrounding exposure incidents as required by subsection (6)(c)(i) of this section.

(iii) Each employer shall ensure that a copy of the exposure control plan is accessible to employees in accordance with WAC 296-62-05209.

(iv) The exposure control plan shall be reviewed and updated at least annually, and whenever necessary to reflect new or modified tasks and procedures which affect occupational exposure, and to reflect new or revised employee positions with occupational exposure.

(v) The exposure control plan shall be made available to the director upon request for examination and copying.

(b) Exposure determination.

(i) Each employer who has an employee(s) with occupational exposure as defined by subsection (2) of this section shall prepare an exposure determination. This exposure determination shall contain the following:

(A) A list of all job classifications in which all employees in those job classifications have occupational exposure;

(B) A list of job classifications in which some employees have occupational exposure; and

(C) A list of all tasks and procedures or groups of closely related tasks and procedures in which occupational exposure occurs, and that are performed by employees in job classifications listed in accordance with the provisions of (b)(i)(B) of this subsection.

(ii) This exposure determination shall be made without regard to the use of personal protective equipment.

(4) Methods of compliance.

(a) General. Universal precautions shall be observed to prevent contact with blood or other potentially infectious materials. Under circumstances in which differentiation between body fluid types is difficult or impossible, all body fluids shall be considered potentially infectious materials.

(b) Engineering and work practice controls.

(i) Engineering and work practice controls shall be used to eliminate or minimize employee exposure. Where occupational exposure remains after institution of these controls, personal protective equipment shall also be used.

(ii) Engineering controls shall be examined and maintained or replaced on a regular schedule to ensure their effectiveness.

(iii) Employers shall provide handwashing facilities which are readily accessible to employees.

(iv) When provision of handwashing facilities is not feasible, the employer shall provide either an appropriate antiseptic hand cleanser in conjunction with clean cloth/paper towels or antiseptic towelettes. When antiseptic hand cleansers or towelettes are used, hands shall be washed with soap and running water as soon as feasible.

(v) Employers shall ensure that employees wash their hands immediately or as soon as feasible after removal of gloves or other personal protective equipment.

(vi) Employers shall ensure that employees wash hands and any other skin with soap and water, or flush mucous membranes with water immediately or as soon as feasible

following contact of such body areas with blood or other potentially infectious materials.

(vii) Contaminated needles and other contaminated sharps shall not be bent, recapped, or removed except as noted in (b)(vii)(A) and (B) of this subsection. Shearing or breaking of contaminated needles is prohibited.

(A) Contaminated needles and other contaminated sharps shall not be bent, recapped or removed unless the employer can demonstrate that no alternative is feasible or that such action is required by a specific medical or dental procedure.

(B) Such bending, recapping or needle removal must be accomplished through the use of a mechanical device or a one-handed technique.

(viii) Immediately or as soon as possible after use, contaminated reusable sharps shall be placed in appropriate containers until properly reprocessed. These containers shall be:

(A) Puncture resistant;

(B) Labeled or color-coded in accordance with this standard;

(C) Leakproof on the sides and bottom; and

(D) In accordance with the requirements set forth in (d)(ii)(E) of this subsection for reusable sharps.

(ix) Eating, drinking, smoking, applying cosmetics, or lip balm, and handling contact lenses are prohibited in work areas where there is a reasonable likelihood of occupational exposure.

(x) Food and drink shall not be kept in refrigerators, freezers, shelves, cabinets, or on countertops or benchtops where blood or other potentially infectious materials are present.

(xi) All procedures involving blood or other potentially infectious materials shall be performed in such a manner as to minimize splashing, spraying, spattering, and generation of droplets of these substances.

(xii) Mouth pipetting/suctioning of blood or other potentially infectious materials is prohibited.

(xiii) Specimens of blood or other potentially infectious materials shall be placed in a container which prevents leakage during collection, handling, processing, storage, transport, or shipping.

(A) The container for storage, transport, or shipping shall be labeled or color-coded according to subsection (7)(a)(i) of this section and closed prior to being stored, transported, or shipped. When a facility utilizes universal precautions in the handling of all specimens, the labeling/color-coding of specimens is not necessary provided containers are recognizable as containing specimens. This exemption only applies while such specimens/containers remain within the facility. Labeling or color-coding in accordance with subsection (7)(a)(i) of this section is required when such specimens/containers leave the facility.

(B) If outside contamination of the primary container occurs, the primary container shall be placed within a second container which prevents leakage during handling, processing, storage, transport, or shipping and is labeled or color-coded according to the requirements of this standard.

(C) If the specimen could puncture the primary container, the primary container shall be placed within a secondary

container which is punctured-resistant in addition to the above characteristics.

(xiv) Equipment which may become contaminated with blood or other potentially infectious materials shall be examined prior to servicing or shipping and shall be decontaminated as necessary, unless the employer can demonstrate that decontamination of such equipment or portions of such equipment is not feasible.

(A) A readily observable label in accordance with subsection (7)(a)(i)(H) of this section shall be attached to the equipment stating which portions remain contaminated.

(B) The employer shall ensure that this information is conveyed to all affected employees, the servicing representative, and/or the manufacturer, as appropriate, prior to handling, servicing, or shipping so that appropriate precautions will be taken.

(c) Personal protective equipment.

(i) Provision. When there is occupational exposure, the employer shall provide, at no cost to the employee, appropriate personal protective equipment such as, but not limited to, gloves, gowns, laboratory coats, face shields or masks and eye protection, and mouthpieces, resuscitation bags, pocket masks, or other ventilation devices. Personal protective equipment will be considered "appropriate" only if it does not permit blood or other potentially infectious materials to pass through to or reach the employee's work clothes, street clothes, undergarments, skin, eyes, mouth, or other mucous membranes under normal conditions of use and for the duration of time which the protective equipment will be used.

(ii) Use. The employer shall ensure that the employee uses appropriate personal protective equipment unless the employer shows that the employee temporarily and briefly declined to use personal protective equipment when, under rare and extraordinary circumstances, it was the employee's professional judgment that in the specific instance its use would have prevented the delivery of health care or public safety services or would have posed an increased hazard to the safety of the worker or the co-worker. When the employee makes this judgment, the circumstances shall be investigated and documented in order to determine whether changes can be instituted to prevent such occurrences in the future.

(iii) Accessibility. The employer shall ensure that appropriate personal protective equipment in the appropriate sizes is readily accessible at the worksite or is issued to employees. Hypoallergenic gloves, glove liners, powderless gloves, or other similar alternatives shall be readily accessible to those employees who are allergic to the gloves normally provided.

(iv) Cleaning, laundering, and disposal. The employer shall clean, launder, and dispose of personal protective equipment required by subsections (4) and (5) of this section, at no cost to the employee.

(v) Repair and replacement. The employer shall repair or replace personal protective equipment as needed to maintain its effectiveness, at no cost to the employee.

(vi) If a garment(s) is penetrated by blood or other potentially infectious materials, the garment(s) shall be removed immediately or as soon as feasible.

(vii) All personal protective equipment shall be removed prior to leaving the work area.

(viii) When personal protective equipment is removed it shall be placed in an appropriately designated area or container for storage, washing, decontamination, or disposal.

(ix) Gloves. Gloves shall be worn when it can be reasonably anticipated that the employee may have hand contact with blood, other potentially infectious materials, mucous membranes, and nonintact skin; when performing vascular access procedures except as specified in (c)(ix)(D) of this subsection; and when handling or touching contaminated items or surfaces.

(A) Disposable (single use) gloves such as surgical or examination gloves, shall be replaced as soon as practical when contaminated or as soon as feasible if they are torn, punctured, or when their ability to function as a barrier is compromised.

(B) Disposable (single use) gloves shall not be washed or decontaminated for re-use.

(C) Utility gloves may be decontaminated for re-use if the integrity of the glove is not compromised. However, they must be discarded if they are cracked, peeling, torn, punctured, or exhibit other signs of deterioration or when their ability to function as a barrier is compromised.

(D) If an employer in a volunteer blood donation center judges that routine gloving for all phlebotomies is not necessary then the employer shall:

(I) Periodically reevaluate this policy;

(II) Make gloves available to all employees who wish to use them for phlebotomy;

(III) Not discourage the use of gloves for phlebotomy; and

(IV) Require that gloves be used for phlebotomy in the following circumstances:

—When the employee has cuts, scratches, or other breaks in his or her skin;

—When the employee judges that hand contamination with blood may occur, for example, when performing phlebotomy on an uncooperative source individual; and

—When the employee is receiving training in phlebotomy.

(x) Masks, eye protection, and face shields. Masks in combination with eye protection devices, such as goggles or glasses with solid side shields, or chin-length face shields, shall be worn whenever splashes, spray, spatter, or droplets of blood or other potentially infectious materials may be generated and eye, nose, or mouth contamination can be reasonably anticipated.

(xi) Gowns, aprons, and other protective body clothing. Appropriate protective clothing such as, but not limited to, gowns, aprons, lab coats, clinic jackets, or similar outer garments shall be worn in occupational exposure situations. The type and characteristics will depend upon the task and degree of exposure anticipated.

(xii) Surgical caps or hoods and/or shoe covers or boots shall be worn in instances when gross contamination can reasonably be anticipated (e.g., autopsies, orthopaedic surgery).

(d) Housekeeping.

(i) General. Employers shall ensure that the worksite is maintained in a clean and sanitary condition. The employer

shall determine and implement an appropriate written schedule for cleaning and method of decontamination based upon the location within the facility, type of surface to be cleaned, type of soil present, and tasks or procedures being performed in the area.

(ii) All equipment and environmental and working surfaces shall be cleaned and decontaminated after contact with blood or other potentially infectious materials.

(A) Contaminated work surfaces shall be decontaminated with an appropriate disinfectant after completion of procedures; immediately or as soon as feasible when surfaces are overtly contaminated or after any spill of blood or other potentially infectious materials; and at the end of the workshift if the surface may have become contaminated since the last cleaning.

(B) Protective coverings, such as plastic wrap, aluminum foil, or imperviously-backed absorbent paper used to cover equipment and environmental surfaces, shall be removed and replaced as soon as feasible when they become overtly contaminated or at the end of the workshift if they may have become contaminated during the shift.

(C) All bins, pails, cans, and similar receptacles intended for reuse which have a reasonable likelihood for becoming contaminated with blood or other potentially infectious materials shall be inspected and decontaminated on a regularly scheduled basis and cleaned and decontaminated immediately or as soon as feasible upon visible contamination.

(D) Broken glassware which may be contaminated shall not be picked up directly with the hands. It shall be cleaned up using mechanical means, such as a brush and dust pan, tongs, or forceps.

(E) Reusable sharps that are contaminated with blood or other potentially infectious materials shall not be stored or processed in a manner that requires employees to reach by hand into the containers where these sharps have been placed.

(iii) Regulated waste.

(A) Contaminated sharps discarding and containment.

(I) Contaminated sharps shall be discarded immediately or as soon as feasible in containers that are:

—Closable;

—Puncture resistant;

—Leakproof on sides and bottom; and

—Labeled or color-coded in accordance with subsection

(7)(a)(i) of this section.

(II) During use, containers for contaminated sharps shall be:

—Easily accessible to personnel and located as close as is feasible to the immediate area where sharps are used or can be reasonably anticipated to be found (e.g., laundries);

—Maintained upright throughout use; and

—Replaced routinely and not be allowed to overfill.

(III) When moving containers of contaminated sharps from the area of use, the containers shall be:

—Closed immediately prior to removal or replacement to prevent spillage or protrusion of contents during handling, storage, transport, or shipping;

—Placed in a secondary container if leakage is possible.

The second container shall be:

● Closable;

- Constructed to contain all contents and prevent leakage during handling, storage, transport, or shipping; and

- Labeled or color-coded according to subsection (7)(a)(i) of this section.

(IV) Reusable containers shall not be opened, emptied, or cleaned manually or in any other manner which would expose employees to the risk of percutaneous injury.

(B) Other regulated waste containment.

(I) Regulated waste shall be placed in containers which are:

- Closable;

- Constructed to contain all contents and prevent leakage of fluids during handling, storage, transport, or shipping;

- Labeled or color-coded in accordance with subsection (7)(a)(i) of this section; and

- Closed prior to removal to prevent spillage or protrusion of contents during handling, storage, transport, or shipping.

(II) If outside contamination of the regulated waste container occurs, it shall be placed in a second container. The second container shall be:

- Closable;

- Constructed to contain all contents and prevent leakage of fluids during handling, storage, transport, or shipping;

- Labeled or color-coded in accordance with subsection (7)(a)(i) of this section; and

- Closed prior to removal to prevent spillage or protrusion of contents during handling, storage, transport, or shipping.

(C) Disposal of all regulated waste shall be in accordance with applicable regulations of the United States, states and territories, and political subdivisions of states and territories.

(iv) Laundry.

(A) Contaminated laundry shall be handled as little as possible with a minimum of agitation.

(I) Contaminated laundry shall be bagged or containerized at the location where it was used and shall not be sorted or rinsed in the location of use.

(II) Contaminated laundry shall be placed and transported in bags or containers labeled or color-coded in accordance with subsection (7)(a)(i) of this section. When a facility utilizes universal precautions in the handling of all soiled laundry, alternative labeling or color-coding is sufficient if it permits all employees to recognize the containers as requiring compliance with universal precautions.

(III) Whenever contaminated laundry is wet and presents a reasonable likelihood of soak-through or leakage from the bag or container, the laundry shall be placed and transported in bags or containers which prevent soak-through and/or leakage of fluids to the exterior.

(B) The employer shall ensure that employees who have contact with contaminated laundry wear protective gloves and other appropriate personal protective equipment.

(C) When a facility ships contaminated laundry off-site to a second facility which does not utilize universal precautions in the handling of all laundry, the facility generating the contaminated laundry must place such laundry in bags or containers which are labeled or color-coded in accordance with subsection (7)(a)(i) of this section.

(5) HIV and HBV research laboratories and production facilities.

(a) This subsection applies to research laboratories and production facilities engaged in the culture, production, concentration, experimentation, and manipulation of HIV and HBV. It does not apply to clinical or diagnostic laboratories engaged solely in the analysis of blood, tissues, or organs. These requirements apply in addition to the other requirements of the standard.

(b) Research laboratories and production facilities shall meet the following criteria:

(i) Standard microbiological practices. All regulated waste shall either be incinerated or decontaminated by a method such as autoclaving known to effectively destroy bloodborne pathogens.

(ii) Special practices.

(A) Laboratory doors shall be kept closed when work involving HIV or HBV is in progress.

(B) Contaminated materials that are to be decontaminated at a site away from the work area shall be placed in a durable, leakproof, labeled, or color-coded container that is closed before being removed from the work area.

(C) Access to the work area shall be limited to authorized persons. Written policies and procedures shall be established whereby only persons who have been advised of the potential biohazard, who meet any specific entry requirements, and who comply with all entry and exit procedures shall be allowed to enter the work areas and animal rooms.

(D) When other potentially infectious materials or infected animals are present in the work area or containment module, a hazard warning sign incorporating the universal biohazard symbol shall be posted on all access doors. The hazard warning sign shall comply with subsection (7)(a)(ii) of this section.

(E) All activities involving other potentially infectious materials shall be conducted in biological safety cabinets or other physical-containment devices within the containment module. No work with these other potentially infectious materials shall be conducted on the open bench.

(F) Laboratory coats, gowns, smocks, uniforms, or other appropriate protective clothing shall be used in the work area and animal rooms. Protective clothing shall not be worn outside of the work area and shall be decontaminated before being laundered.

(G) Special care shall be taken to avoid skin contact with other potentially infectious materials. Gloves shall be worn when handling infected animals and when making hand contact with other potentially infectious materials is unavoidable.

(H) Before disposal all waste from work areas and from animal rooms shall either be incinerated or decontaminated by a method such as autoclaving known to effectively destroy bloodborne pathogens.

(I) Vacuum lines shall be protected with liquid disinfectant traps and high-efficiency particulate air (HEPA) filters or filters of equivalent or superior efficiency and which are checked routinely and maintained or replaced as necessary.

(J) Hypodermic needles and syringes shall be used only for parenteral injection and aspiration of fluids from laboratory animals and diaphragm bottles. Only needle-locking syringes or disposable syringe-needle units (i.e., the needle

is integral to the syringe) shall be used for the injection or aspiration of other potentially infectious materials. Extreme caution shall be used when handling needles and syringes. A needle shall not be bent, sheared, replaced in the sheath or guard, or removed from the syringe following use. The needle and syringe shall be promptly placed in a puncture-resistant container and autoclaved or decontaminated before reuse or disposal.

(K) All spills shall be immediately contained and cleaned up by appropriate professional staff or others properly trained and equipped to work with potentially concentrated infectious materials.

(L) A spill or accident that results in an exposure incident shall be immediately reported to the laboratory director or other responsible person.

(M) A biosafety manual shall be prepared or adopted and periodically reviewed and updated at least annually or more often if necessary. Personnel shall be advised of potential hazards, shall be required to read instructions on practices and procedures, and shall be required to follow them.

(iii) Containment equipment.

(A) Certified biological safety cabinets (Class I, II, or III) or other appropriate combinations of personal protection or physical containment devices, such as special protective clothing, respirators, centrifuge safety cups, sealed centrifuge rotors, and containment caging for animals, shall be used for all activities with other potentially infectious materials that pose a threat of exposure to droplets, splashes, spills, or aerosols.

(B) Biological safety cabinets shall be certified when installed, whenever they are moved and at least annually.

(c) HIV and HBV research laboratories shall meet the following criteria:

(i) Each laboratory shall contain a facility for hand washing and an eyewash facility which is readily available within the work area.

(ii) An autoclave for decontamination of regulated waste shall be available.

(d) HIV and HBV production facilities shall meet the following criteria:

(i) The work areas shall be separated from areas that are open to unrestricted traffic flow within the building. Passage through two sets of doors shall be the basic requirement for entry into the work area from access corridors or other contiguous areas. Physical separation of the high-containment work area from access corridors or other areas or activities may also be provided by a double-doored clothes-change room (showers may be included), airlock, or other access facility that requires passing through two sets of doors before entering the work area.

(ii) The surfaces of doors, walls, floors, and ceilings in the work area shall be water resistant so that they can be easily cleaned. Penetrations in these surfaces shall be sealed or capable of being sealed to facilitate decontamination.

(iii) Each work area shall contain a sink for washing hands and a readily available eye wash facility. The sink shall be foot, elbow, or automatically operated and shall be located near the exit door of the work area.

(iv) Access doors to the work area or containment module shall be self-closing.

(v) An autoclave for decontamination of regulated waste shall be available within or as near as possible to the work area.

(vi) A ducted exhaust-air ventilation system shall be provided. This system shall create directional airflow that draws air into the work area through the entry area. The exhaust air shall not be recirculated to any other area of the building, shall be discharged to the outside, and shall be dispersed away from occupied areas and air intakes. The proper direction of the airflow shall be verified (i.e., into the work area).

(e) Training requirements. Additional training requirements for employees in HIV and HBV research laboratories and HIV and HBV production facilities are specified in subsection (7)(b)(ix) of this section.

(6) Hepatitis B vaccination and post-exposure evaluation and follow-up.

(a) General.

(i) The employer shall make available the hepatitis B vaccine and vaccination series to all employees who have occupational exposure, and post-exposure evaluation and follow-up to all employees who have had an exposure incident.

(ii) The employer shall ensure that all medical evaluations and procedures including the hepatitis B vaccine and vaccination series and post-exposure evaluation and follow-up, including prophylaxis, are:

(A) Made available at no cost to the employee;

(B) Made available to the employee at a reasonable time and place;

(C) Performed by or under the supervision of a licensed physician or by or under the supervision of another licensed healthcare professional; and

(D) Provided according to recommendations of the United States Public Health Service current at the time these evaluations and procedures take place, except as specified by this subsection (6).

(iii) The employer shall ensure that all laboratory tests are conducted by an accredited laboratory at no cost to the employee.

(b) Hepatitis B vaccination.

(i) Hepatitis B vaccination shall be made available after the employee has received the training required in subsection (7)(b)(vii)(I) of this section and within ten working days of initial assignment to all employees who have occupational exposure unless the employee has previously received the complete hepatitis B vaccination series, antibody testing has revealed that the employee is immune, or the vaccine is contraindicated for medical reasons.

(ii) The employer shall not make participation in a prescreening program a prerequisite for receiving hepatitis B vaccination.

(iii) If the employee initially declines hepatitis B vaccination but at a later date while still covered under the standard decides to accept the vaccination, the employer shall make available hepatitis B vaccination at that time.

(iv) The employer shall assure that employees who decline to accept hepatitis B vaccination offered by the employer sign the statement in WAC 296-62-08050, appendix A.

(v) If a routine booster dose(s) of hepatitis B vaccine is recommended by the United States Public Health Service at a future date, such booster dose(s) shall be made available in accordance with (a)(ii) of this subsection.

(c) Post-exposure evaluation and follow-up. Following a report of an exposure incident, the employer shall make immediately available to the exposed employee a confidential medical evaluation and follow-up, including at least the following elements:

(i) Documentation of the route(s) of exposure, and the circumstances under which the exposure incident occurred;

(ii) Identification and documentation of the source individual, unless the employer can establish that identification is infeasible or prohibited by state or local law;

(A) The source individual's blood shall be tested as soon as feasible and after consent is obtained in order to determine HBV and HIV infectivity. If consent is not obtained, the employer shall establish that legally required consent cannot be obtained. When the source individual's consent is not required by law, the source individual's blood, if available, shall be tested and the results documented.

(B) When the source individual is already known to be infected with HBV or HIV, testing for the source individual's known HBV or HIV status need not be repeated.

(C) Results of the source individual's testing shall be made available to the exposed employee, and the employee shall be informed of applicable laws and regulations concerning disclosure of the identity and infectious status of the source individual.

(iii) Collection and testing of blood for HBV and HIV serological status;

(A) The exposed employee's blood shall be collected as soon as feasible and tested after consent is obtained.

(B) If the employee consents to baseline blood collection, but does not give consent at that time for HIV serologic testing, the sample shall be preserved for at least ninety days. If, within ninety days of the exposure incident, the employee elects to have the baseline sample tested, such testing shall be done as soon as feasible.

(iv) Post-exposure prophylaxis, when medically indicated, as recommended by the United States Public Health Service;

(v) Counseling; and

(vi) Evaluation of reported illnesses.

(d) Information provided to the healthcare professional.

(i) The employer shall ensure that the healthcare professional responsible for the employee's hepatitis B vaccination is provided a copy of this regulation.

(ii) The employer shall ensure that the healthcare professional evaluating an employee after an exposure incident is provided the following information:

(A) A copy of this regulation;

(B) A description of the exposed employee's duties as they relate to the exposure incident;

(C) Documentation of the route(s) of exposure and circumstances under which exposure occurred;

(D) Results of the source individual's blood testing, if available; and

(E) All medical records relevant to the appropriate treatment of the employee including vaccination status which are the employer's responsibility to maintain.

(e) Healthcare professional's written opinion. The employer shall obtain and provide the employee with a copy of the evaluating healthcare professional's written opinion within fifteen days of the completion of the evaluation.

(i) The healthcare professional's written opinion for hepatitis B vaccination shall be limited to whether hepatitis B vaccination is indicated for an employee, and if the employee has received such vaccination.

(ii) The healthcare professional's written opinion for post-exposure evaluation and follow-up shall be limited to the following information:

(A) That the employee has been informed of the results of the evaluation; and

(B) That the employee has been told about any medical conditions resulting from exposure to blood or other potentially infectious materials which require further evaluation or treatment.

(iii) All other findings or diagnoses shall remain confidential and shall not be included in the written report.

(f) Medical recordkeeping. Medical records required by this standard shall be maintained in accordance with subsection (8)(a) of this section.

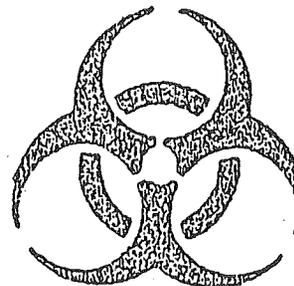
(7) Communication of hazards to employees.

(a) Labels and signs.

(i) Labels.

(A) Warning labels shall be affixed to containers of regulated waste, refrigerators and freezers containing blood or other potentially infectious material; and other containers used to store, transport or ship blood or other potentially infectious materials, except as provided in (a)(i)(E), (F), and (G) of this subsection.

(B) Labels required by this section shall include the following legend:



BIOHAZARD

(C) These labels shall be fluorescent orange or orange-red or predominantly so, with lettering and symbols in a contrasting color.

(D) Labels shall be affixed as close as feasible to the container by string, wire, adhesive, or other method that prevents their loss or unintentional removal.

(E) Red bags or red containers may be substituted for labels.

(F) Containers of blood, blood components, or blood products that are labeled as to their contents and have been released for transfusion or other clinical use are exempted from the labeling requirements of subsection (7) of this section.

(G) Individual containers of blood or other potentially infectious materials that are placed in a labeled container during storage, transport, shipment or disposal are exempted from the labeling requirement.

(H) Labels required for contaminated equipment shall be in accordance with this subitem and shall also state which portions of the equipment remain contaminated.

(I) Regulated waste that has been decontaminated need not be labeled or color-coded.

(ii) Signs.

(A) The employer shall post signs at the entrance to work areas specified in subsection (5) of this section, entitled HIV and HBV research laboratory and production facilities, which shall bear the following legend:



BIOHAZARD

(Name of the Infectious Agent)
(Special requirements for entering the area)
(Name, telephone number of the laboratory director
or other responsible person.)

(B) These signs shall be fluorescent orange-red or predominantly so, with lettering and symbols in a contrasting color.

(b) Information and training.

(i) Employers shall ensure that all employees with occupational exposure participate in a training program which must be provided at no cost to the employee and during working hours.

(ii) Training shall be provided as follows:

(A) At the time of initial assignment to tasks where occupational exposure may take place;

(B) Within ninety days after the effective date of the standard; and

(C) At least annually thereafter.

(iii) For employees who have received training on bloodborne pathogens in the year preceding the effective date of the standard, only training with respect to the provisions of the standard which were not included need be provided.

(iv) Annual training for all employees shall be provided within one year of their previous training.

(v) Employers shall provide additional training when changes such as modification of tasks or procedures or institution of new tasks or procedures affect the employee's occupational exposure. The additional training may be limited to addressing the new exposures created.

(vi) Material appropriate in content and vocabulary to educational level, literacy, and language of employees shall be used.

(vii) The training program shall contain at a minimum the following elements:

(A) An accessible copy of the regulatory text of this standard and an explanation of its contents;

(B) A general explanation of the epidemiology and symptoms of bloodborne diseases;

(C) An explanation of the modes of transmission of bloodborne pathogens;

(D) An explanation of the employer's exposure control plan and the means by which the employee can obtain a copy of the written plan;

(E) An explanation of the appropriate methods for recognizing tasks and other activities that may involve exposure to blood and other potentially infectious materials;

(F) An explanation of the use and limitations of methods that will prevent or reduce exposure including appropriate engineering controls, work practices, and personal protective equipment;

(G) Information on the types, proper use, location, removal, handling, decontamination and disposal of personal protective equipment;

(H) An explanation of the basis for selection of personal protective equipment;

(I) Information on the hepatitis B vaccine, including information on its efficacy, safety, method of administration, the benefits of being vaccinated, and that the vaccine and vaccination will be offered free of charge;

(J) Information on the appropriate actions to take and persons to contact in an emergency involving blood or other potentially infectious materials;

(K) An explanation of the procedure to follow if an exposure incident occurs, including the method of reporting the incident and the medical follow-up that will be made available;

(L) Information on the post-exposure evaluation and follow-up that the employer is required to provide for the employee following an exposure incident;

(M) An explanation of the signs and labels and/or color coding required by (a) of this subsection; and

(N) An opportunity for interactive questions and answers with the person conducting the training session.

(viii) The person conducting the training shall be knowledgeable in the subject matter covered by the elements contained in the training program as it relates to the workplace that the training will address.

(ix) Additional initial training for employees in HIV and HBV laboratories and production facilities. Employees in HIV or HBV research laboratories and HIV or HBV production facilities shall receive the following initial training in addition to the above training requirements:

(A) The employer shall assure that employees demonstrate proficiency in standard microbiological practices and techniques and in the practices and operations specific to the facility before being allowed to work with HIV or HBV.

(B) The employer shall assure that employees have prior experience in the handling of human pathogens or tissue cultures before working with HIV or HBV.

(C) The employer shall provide a training program to employees who have no prior experience in handling human pathogens. Initial work activities shall not include the handling of infectious agents. A progression of work activities shall be assigned as techniques are learned and proficiency is developed. The employer shall assure that employees participate in work activities involving infectious agents only after proficiency has been demonstrated.

(8) Recordkeeping.

(a) Medical records.

(i) The employer shall establish and maintain an accurate record for each employee with occupational exposure, in accordance with WAC 296-62-052.

(ii) This record shall include:

(A) The name and Social Security number of the employee;

(B) A copy of the employee's hepatitis B vaccination status including the dates of all the hepatitis B vaccinations and any medical records relative to the employee's ability to receive vaccination as required by subsection (6)(b) of this section;

(C) A copy of all results of examinations, medical testing, and follow-up procedures as required by subsection (6)(c) of this section;

(D) The employer's copy of the healthcare professional's written opinion as required by subsection (6)(e) of this section; and

(E) A copy of the information provided to the healthcare professional as required by subsection (6)(d)(ii)(B), (C), and (D) of this section.

(iii) Confidentiality. The employer shall ensure that employee medical records required by (a) of this subsection are:

(A) Kept confidential; and

(B) Not disclosed or reported without the employee's express written consent to any person within or outside the workplace except as required by this section or as may be required by law.

(iv) The employer shall maintain the records required by subsection (8) of this section for at least the duration of employment plus thirty years in accordance with WAC 296-62-052.

(b) Training records.

(i) Training records shall include the following information:

(A) The dates of the training sessions;

(B) The contents or a summary of the training sessions;

(C) The names and qualifications of persons conducting the training; and

(D) The names and job titles of all persons attending the training sessions.

(ii) Training records shall be maintained for three years from the date on which the training occurred.

(c) Availability.

(i) The employer shall ensure that all records required to be maintained by this section shall be made available upon request to the director for examination and copying.

(ii) Employee training records required by this section shall be provided upon request for examination and copying to employees, to employee representatives, and to the director.

(iii) Employee medical records required by this section shall be provided upon request for examination and copying to the subject employee, to anyone having written consent of the subject employee, to the director in accordance with WAC 296-62-052.

(d) Transfer of records.

(i) The employer shall comply with the requirements involving transfer of records set forth in WAC 296-62-052.

(ii) If the employer ceases to do business and there is no successor employer to receive and retain the records for the prescribed period, the employer shall notify the director, at least three months prior to their disposal and transmit them to the director, if required by the director to do so, within that three-month period.

(9) Dates.

(a) Effective date. The standard shall become effective on May 26, 1992.

(b) The exposure control plan required by subsection (3) of this section shall be completed on or before June 26, 1992.

(c) Subsection (7)(b) of this section, entitled Information and training; and subsection (7)(h) of this section, entitled Recordkeeping; shall take effect on or before July 27, 1992.

(d) Subsection (4)(b) of this section, entitled Engineering and work practice controls; subsection (4)(c) of this section, entitled Personal protective equipment; subsection (4)(d) of this section, entitled Housekeeping; subsection (5) of this section, entitled HIV and HBV research laboratories and production facilities; subsection (6) of this section, entitled Hepatitis B vaccination and post-exposure evaluation and follow-up; and subsection (7)(a) of this section, entitled Labels and signs; shall take effect August 27, 1992.

[Statutory Authority: Chapter 49.17 RCW. 93-01-067 (Order 92-15), § 296-62-08001, filed 12/11/92, effective 1/15/93; 92-08-100 (Order 92-01), § 296-62-08001, filed 4/1/92, effective 5/5/92.]

WAC 296-62-08050 Appendix A—Hepatitis B vaccine declination—Mandatory. I understand that due to my occupational exposure to blood or other potentially infectious materials I may be at risk of acquiring hepatitis B virus (HBV) infection. I have been given the opportunity to be vaccinated with hepatitis B vaccine, at no charge to myself. However, I decline hepatitis B vaccination at this time. I understand that by declining this vaccine, I continue to be at risk of acquiring hepatitis B, a serious disease. If in the future I continue to have occupational exposure to blood or other potentially infectious materials and I want to be vaccinated with hepatitis B vaccine, I can receive the vaccination series at no charge to me.

[Statutory Authority: Chapter 49.17 RCW. 92-08-100 (Order 92-01), § 296-62-08050, filed 4/1/92, effective 5/5/92.]

Part J-1—PHYSICAL AGENTS

WAC 296-62-090 Physical agents.

[Order 73-3, § 296-62-090, filed 5/7/73; Order 70-8, § 296-62-090, filed 7/31/70, effective 9/1/70; Rule 9.010, effective 8/1/63.]

WAC 296-62-09001 Definitions. (1) "Physical agents" shall mean, but are not limited to: Illumination,

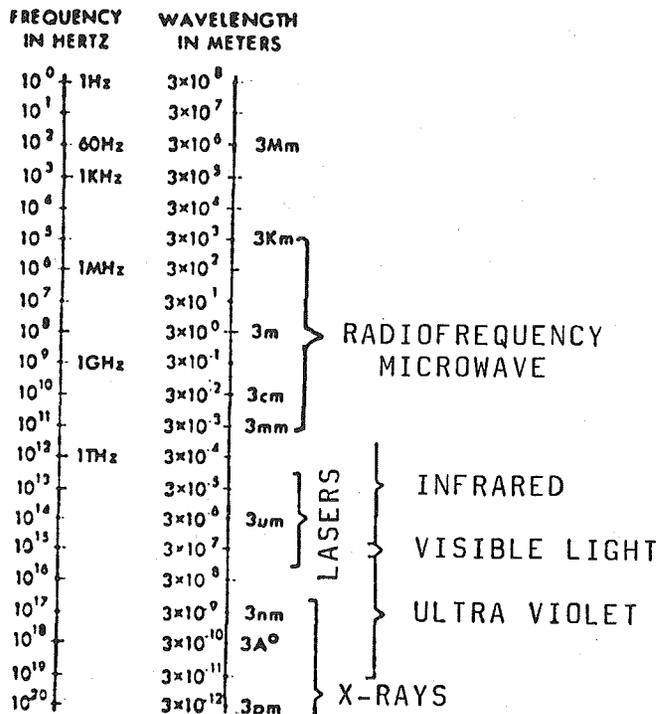
ionizing radiation, nonionizing radiation, pressure, vibration, temperature and humidity, and noise.

(2) "Illumination" means radiant energy evaluated according to its capacity to produce visual sensation.

(3) "Nonionizing radiation" as related to industrial sources, means electromagnetic radiation within the spectral range of approximately 200 nanometers to 3 kilometers including ultraviolet, visible, infrared and radiofrequency/microwave radiation. The electromagnetic spectrum is shown graphically in Figure 1 below.

ELECTROMAGNETIC SPECTRUM

Figure 1



(4) Pressure is a barometric force. Positive pressure would be that above 14.7 lbs. per square inch absolute and negative pressure would be that below 14.7 lbs. per square inch absolute. 14.7 lbs. per square inch equals 760 mm. mercury.

(5) "Vibration" means rapid movement to and fro or oscillating movement.

(6) "Noise" means unwanted sound or loud discordant or disagreeable sound or sounds.

(7) "Temperature" means the degree of hotness or coldness measured by use of a thermometer.

(8) "Radiant heat" means infrared radiation emitted from hot surfaces.

(9) "Relative humidity" means the percent of moisture in the air compared to the maximum amount of moisture the air could contain at the same temperature.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 85-01-022 (Order 84-24), § 296-62-09001, filed 12/11/84; Order 73-3, § 296-62-09001, filed 5/7/73.]

WAC 296-62-09003 Lighting and illumination. (1) Lighting which is adequately adjusted to provide a margin of safety for all work tasks shall be provided and maintained.

(a) The minimum level of task lighting for all indoor activities shall be an average of 10 foot candles measured 30 inches above the floor or at the task.

(b) The minimum level of task lighting for all outdoor activities shall be an average of five foot candles measured thirty inches above the working surface or at the task.

(2) If general lighting is not provided throughout the work area, the employer shall provide illumination which is adequately adjusted to provide visibility of nearby objects which might be potential hazards or to see to operate emergency control or other equipment. The minimum level of nontask lighting for all indoor and outdoor activities shall be an average of 3 foot candles measured 30 inches above the floor or working surface.

Note: This section establishes minimal levels of illumination for safety purposes only. Guidelines pertaining to optimal levels of lighting and illumination may be found in Practice for Industrial Lighting, ANSI/IES RP7-1979. The minimum levels specified in subsections (1) and (2) of this section represent averages with the lowest level in an area to be no less than fifty percent of the indicated value.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-62-09003, filed 11/30/83; 82-13-045 (Order 82-22), § 296-62-09003, filed 6/11/82; Order 76-6, § 296-62-09003, filed 3/1/76; Order 73-3, § 296-62-09003, filed 5/7/73.]

WAC 296-62-09004 Ionizing radiation. (1) Definitions applicable to this section.

Note: Definitions also appear in some subsections.

(a) "Radiation" includes alpha rays, beta rays, gamma rays, x-rays, neutrons, high-speed electrons, high-speed protons, and other atomic particles; but such term does not include sound or radio waves, or visible light, or infrared or ultraviolet light.

(b) "Radioactive material" means any material which emits, by spontaneous nuclear disintegration, corpuscular or electromagnetic emanations.

(c) "Restricted area" means any area access to which is controlled by the employer for purposes of protection of individuals from exposure to radiation or radioactive materials.

(d) "Unrestricted area" means any area access to which is not controlled by the employer for purposes of protection of individuals from exposure to radiation or radioactive materials.

(e) "Dose" means the quantity of ionizing radiation absorbed, per unit of mass, by the body or by any portion of the body. When the provisions in this section specify a dose during a period of time, the dose is the total quantity of radiation absorbed, per unit of mass, by the body or by any portion of the body during such period of time. Several different units of dose are in current use. Definitions of units used in this section are set forth in subdivisions (f) and (g) of this subsection.

(f) "Rad" means a measure of the dose of any ionizing radiation to body tissues in terms of the energy absorbed per unit of mass of the tissue. One rad is the dose correspond-

ing to the absorption of 100 ergs per gram of tissue (1 millirad (mrad) = 0.001 rad).

(g) "Rem" means a measure of the dose of any ionizing radiation to body tissue in terms of its estimated biological effect relative to a dose of 1 roentgen (r) of x-rays (1 millirem (mrem) = 0.001 rem). The relation of the rem to other dose units depends upon the biological effect under consideration and upon the conditions for irradiation. Each of the following is considered to be equivalent to a dose of 1 rem:

(i) A dose of 1 roentgen due to x- or gamma radiation;
 (ii) A dose of 1 rad due to x-, gamma, or beta radiation;
 (iii) A dose of 0.1 rad due to neutrons or high energy protons;

(iv) A dose of 0.05 rad due to particles heavier than protons and with sufficient energy to reach the lens of the eye;

(v) If it is more convenient to measure the neutron flux, or equivalent, than to determine the neutron dose in rads, as provided in item (iii) of this subdivision, 1 rem of neutron radiation may, for purposes of the provisions in this section be assumed to be equivalent to 14 million neutrons per square centimeter incident upon the body; or, if there is sufficient information to estimate with reasonable accuracy the approximate distribution in energy of the neutrons, the incident number of neutrons per square centimeter equivalent to 1 rem may be estimated from the following table:

Neutron Flux Dose Equivalents

Neutron energy (million electron volts (Mev))	Number of neutrons per square centimeter equivalent to a dose of 1 rem (neutrons/cm ²)	Average flux to deliver 100 millirem in 40 hours (neutrons/cm ² per sec.)
Thermal	970 X 10 ⁶	670
0.0001	720 X 10 ⁶	500
0.005	820 X 10 ⁶	570
0.02	400 X 10 ⁶	280
0.1	120 X 10 ⁶	80
0.5	43 X 10 ⁶	30
1.0	26 X 10 ⁶	18
2.5	29 X 10 ⁶	20
5.0	26 X 10 ⁶	18
7.5	24 X 10 ⁶	17
10	24 X 10 ⁶	17
10 to 30	14 X 10 ⁶	10

(h) For determining exposures to x- or gamma rays up to 3 Mev., the dose limits specified in this section may be assumed to be equivalent to the "air dose." For the purpose of this section "air dose" means that the dose is measured by a properly calibrated appropriate instrument in air at or near the body surface in the region of the highest dosage rate.

(i) "Curie" means a unit of measurement of radioactivity. One curie (Ci) is that quantity of radioactive material which decays at the rate of 2.2×10^{12} disintegrations per minute (dpm).

(i) One millicurie (mCi) = 10^{-3} Ci

(ii) One microcurie (uCi) = 10^{-6} Ci

(iii) One nanocurie (nCi) = 10^{-9} Ci

(iv) One picocurie (pCi) = 10^{-12} Ci

(2) Nuclear Regulatory Commission licensees—NRC contractors operating NRC plants and facilities.

(a) Any employer who possesses or uses source material, byproduct material, or special nuclear material, as defined in the Atomic Energy Act of 1954, as amended, under a license issued by the Nuclear Regulatory Commission and in accordance with the requirements of chapter 402-24 WAC shall be deemed to be in compliance with the requirements of this section with respect to such possession and use.

(b) NRC contractors operating NRC plants and facilities: Any employer who possesses or uses source material, byproduct material, special nuclear material, or other radiation sources under a contract with the Nuclear Regulatory Commission for the operation of NRC plants and facilities and in accordance with the standards, procedures, and other requirements for radiation protection established by the commission for such contract pursuant to the Atomic Energy Act of 1954 as amended (42 U.S.C. 2011 et seq.) shall be deemed to be in compliance with the requirements of this section with respect to such possession and use.

(c) State licensees or registrants:

(i) Atomic Energy Act sources. Any employer who possesses or uses source material, byproduct material, or special nuclear material, as defined in the Atomic Energy Act of 1954, as amended (42 U.S.C. 2011 et seq.), and has registered such sources with the state shall be deemed to be in compliance with the radiation requirements of this section, insofar as his possession and use of such material is concerned.

(ii) Other sources. Any employer who possesses or uses radiation sources other than source material, byproduct material, or special nuclear material, as defined in the Atomic Energy Act of 1954, as amended (42 U.S.C. 2011 et seq.), and has registered such sources with the state shall be deemed to be in compliance with the radiation requirements of this section insofar as his possession and use of such material is concerned.

(3) Exposure of individuals to radiation in restricted areas.

(a) Except as provided in subdivision (b) of this subsection, no employer shall possess, use, or transfer sources of ionizing radiation in such a manner as to cause any individual in a restricted area to receive in any period of one calendar quarter from sources in the employer's possession or control a dose in excess of the limits specified in the following table:

	Rems per Calendar Quarter
EXPOSURE IN RESTRICTED AREAS	
Whole body: Head and trunk; active blood-forming organs; lens of eyes; or gonads	1 1/4
Hand and forearms; feet and ankles	18 3/4
Skin of whole body	7 1/2

(b) An employer may permit an individual in a restricted area to receive doses to the whole body greater than those permitted under subdivision (a) of this subsection, so long as:

(i) During any calendar quarter the dose to the whole body shall not exceed 3 rems; and

(ii) The dose to the whole body, when added to the accumulated occupational dose to the whole body, shall not exceed 5 (N-18) rems, where "N" equals the individual's age in years at his last birthday; and

(iii) The employer maintains adequate past and current exposure records which show that the addition of such a dose will not cause the individual to exceed the amount authorized in this subdivision. As used in this subdivision "Dose to the whole body" shall be deemed to include any dose to the whole body, gonad, active blood-forming organs, head and trunk, or lens of the eye.

(c) No employer shall permit any employee who is under 18 years of age to receive in any period of one calendar quarter a dose in excess of 10 percent of the limits specified in the preceding table entitled "exposure in restricted areas."

(d) "Calendar quarter" means any 3-month period determined as follows:

(i) The first period of any year may begin on any date in January: *Provided*, That the second, third and fourth periods accordingly begin on the same date in April, July, and October, respectively, and that the fourth period extends into January of the succeeding year, if necessary to complete a 3-month quarter. During the first year of use of this method of determination, the first period for that year shall also include any additional days in January preceding the starting date for the first period; or

(ii) The first period in a calendar year of 13 complete, consecutive calendar weeks; the second period in a calendar year of 13 complete consecutive weeks; the third period in a calendar year of 13 complete, consecutive calendar weeks; the fourth period in a calendar year of 13 complete, consecutive calendar weeks. If at the end of a calendar year there are any days not falling within a complete calendar week of that year, such days shall be included within the last complete calendar week of that year. If at the beginning of any calendar year there are days not falling within a complete calendar week of that year, such days shall be included within the last complete calendar week of the previous year; or

(iii) The four periods in a calendar year may consist of the first 14 complete, consecutive calendar weeks; the next 12 complete, consecutive calendar weeks, the next 14 complete, consecutive calendar weeks, and the last 12 complete, consecutive calendar weeks. If at the end of a calendar year there are any days not falling within a complete calendar week of that year, such days shall be included (for purposes of this section) within the last complete calendar week of the year. If at the beginning of any calendar year there are days not falling within a complete calendar week of that year, such days shall be included (for purposes of this section) within the last complete week of the previous year.

(e) No employer shall change the method used by him to determine calendar quarters except at the beginning of a calendar year.

(4) Exposure to airborne radioactive material.

(a) No employer shall possess, use or transport radioactive material in such a manner as to cause any employee, within a restricted area, to be exposed to airborne radioactive material in an average concentration in excess of the limits specified in Table I of WAC 402-24-220, Appendix A. The limits given in Table I are for exposure to the concentrations specified for 40 hours in any workweek of 7 consecutive days. In any such period where the number of hours of exposure is less than 40 the limits specified in the table may be increased proportionately. In any such period where the number of hours of exposure is greater than 40, the limits specified in the table shall be decreased proportionately.

(b) No employer shall possess, use, or transfer radioactive material in such a manner as to cause any individual within a restricted area, who is under 18 years of age, to be exposed to airborne radioactive material in an average concentration in excess of the limits specified in Table II of WAC 402-24-220, Appendix A.

For purposes of this subdivision, concentrations may be averaged over periods not greater than 1 week.

(c) "Exposed" as used in this subdivision means that the individual is present in an airborne concentration. No allowance shall be made for the use of protective clothing or equipment, or particle size.

(5) Precautionary procedures and personal monitoring.

(a) Every employer shall make such surveys as may be necessary for him to comply with the provisions in this section. "Survey" means an evaluation of the radiation hazards incident to the production, use, release, disposal, or presence of radioactive materials or other sources of radiation under a specific set of conditions. When appropriate, such evaluation includes a physical survey of the location of materials and equipment, and measurements of levels of radiation or concentrations of radioactive material present.

(b) Every employer shall supply appropriate personnel monitoring equipment, such as film badges, pocket chambers, pocket dosimeters, or film rings, to, and shall require the use of such equipment by:

(i) Each employee who enters a restricted area under such circumstances that he receives, or is likely to receive, a dose in any calendar quarter in excess of 25 percent of the applicable value specified in subsection (3)(a) of this section; and

(ii) Each employee under 18 years of age who enters a restricted area under such circumstances that he receives, or is likely to receive a dose in any calendar quarter in excess of 5 percent of the applicable value specified in subsection (3)(a) of this section; and

(iii) Each employee who enters a high radiation area.

(c) As used in this section:

(i) "Personnel monitoring equipment" means devices designed to be worn or carried by an individual for the purpose of measuring the dose received (e.g., film badges, pocket chambers, pocket dosimeters, film rings, etc.);

(ii) "Radiation area" means any area, accessible to personnel, in which there exists radiation at such levels that a major portion of the body could receive in any 1 hour a

dose in excess of 5 millirem, or in any 5 consecutive days a dose in excess of 100 millirem; and

(iii) "High radiation area" means any area, accessible to personnel, in which there exists radiation at such levels that a major portion of the body could receive in any one hour a dose in excess of 100 millirem.

(6) Caution signs, labels and signals.

(a) General.

(i) Symbols prescribed by this subsection shall use the conventional radiation caution colors (magenta or purple on yellow background). The symbol prescribed by this subsection is the conventional three-bladed design:

RADIATION SYMBOL

1. Cross-hatched area is to be magenta or purple.
2. Background is to be yellow.

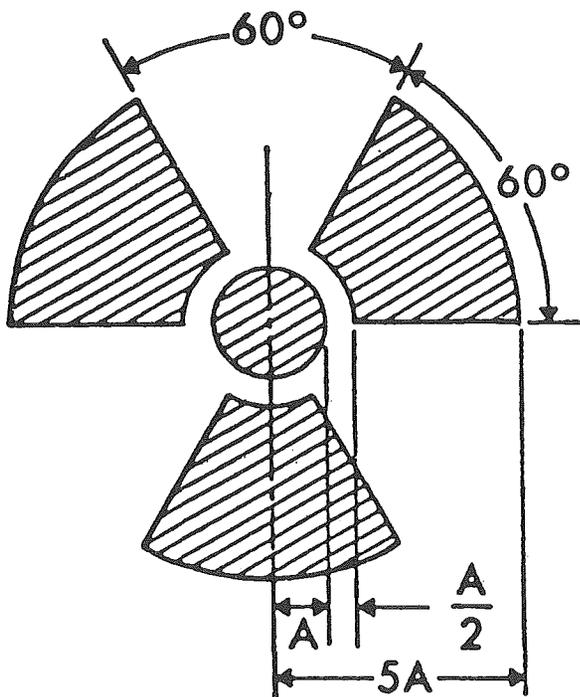


FIGURE G-10

(ii) In addition to the contents of signs and labels prescribed in this subsection, employers may provide on or near such signs and labels any additional information which may be appropriate in aiding individuals to minimize exposure to radiation or to radioactive material.

(b) Radiation area. Each radiation area shall be conspicuously posted with a sign or signs bearing the radiation caution symbol described in subdivision (a) of this subsection and the words:

CAUTION

RADIATION AREA

(c) High radiation area.

(i) Each high radiation area shall be conspicuously posted with a sign or signs bearing the radiation caution symbol and the words:

CAUTION

HIGH RADIATION AREA

(ii) Each high radiation area shall be equipped with a control device which shall either cause the level of radiation to be reduced below that at which an individual might receive a dose of 100 millirems in 1 hour upon entry into the area or shall energize a conspicuous visible or audible alarm signal in such a manner that the individual entering and the employer or a supervisor of the activity are made aware of the entry. In the case of a high radiation area established for a period of 30 days or less, such control device is not required.

(d) Airborne radioactivity area.

(i) As used in the provisions of this section, "airborne radioactivity area" means:

(A) Any room, enclosure, or operating area in which airborne radioactive materials, composed wholly or partly of radioactive material, exist in concentrations in excess of the amounts specified in column 1 of Table I of WAC 402-24-220, Appendix A.

(B) Any room, enclosure, or operating area in which airborne radioactive materials exist in concentrations which, averaged over the number of hours in any week during which individuals are in the area, exceed 25 percent of the amounts specified in column 1 of Table I of WAC 402-24-220, Appendix A.

(ii) Each airborne radioactivity area shall be conspicuously posted with a sign or signs bearing the radiation caution symbol described in subdivision (a) of this subsection and the words:

CAUTION

AIRBORNE RADIOACTIVITY AREA

(e) Additional requirements.

(i) Each area or room in which radioactive material is used or stored and which contains any radioactive material (other than natural uranium or thorium) in any amount exceeding 10 times the quantity of such material specified in WAC 402-24-230, Appendix B shall be conspicuously posted with a sign or signs bearing the radiation caution symbol described in subdivision (a) of this subsection and the words:

CAUTION

RADIOACTIVE MATERIALS

(ii) Each area or room in which natural uranium or thorium is used or stored in an amount exceeding 100 times the quantity of such material specified in chapter 402-24 WAC shall be conspicuously posted with a sign or signs bearing the radiation caution symbol described in subdivision (a) of this subsection and the words:

CAUTION

RADIOACTIVE MATERIALS

(f) Containers.

(i) Each container in which is transported, stored, or used a quantity of any radioactive material (other than natural uranium or thorium) greater than the quantity of such material specified in WAC 402-24-230, Appendix B shall

bear a durable, clearly visible label bearing the radiation caution symbol described in subdivision (a) of this subsection and the words:

CAUTION

RADIOACTIVE MATERIALS

(ii) Each container in which natural uranium or thorium is transported, stored, or used in a quantity greater than 10 times the quantity specified in WAC 402-24-230, Appendix B shall bear a durable, clearly visible label bearing the radiation caution symbol described in subdivision (a) of this subsection and the words:

CAUTION

RADIOACTIVE MATERIALS

(iii) Notwithstanding the provisions of items (i) and (ii) of this subdivision a label shall not be required:

(A) If the concentration of the material in the container does not exceed that specified in column 2 of Table I of WAC 402-24-220, Appendix A.

(B) For laboratory containers, such as beakers, flasks, and test tubes, used transiently in laboratory procedures, when the user is present.

(iv) Where containers are used for storage, the labels required in this subdivision shall state also the quantities and kinds of radioactive materials in the containers and the date of measurement of the quantities.

(7) Immediate evacuation warning signal.

(a) Signal characteristics.

(i) The signal shall be a midfrequency complex sound wave amplitude modulated at a subsonic frequency. The complex sound wave in free space shall have a fundamental frequency f^1 between 450 and 500 hertz (Hz) modulated at a subsonic rate between 4 and 5 hertz.

(ii) The signal generator shall not be less than 75 decibels at every location where an individual may be present whose immediate, rapid, and complete evacuation is essential.

(iii) A sufficient number of signal units shall be installed such that the requirements of item (i) of this subdivision are met at every location where an individual may be present whose immediate, rapid, and complete evacuation is essential.

(iv) The signal shall be unique in the plant or facility in which it is installed.

(v) The minimum duration of the signal shall be sufficient to insure that all affected persons hear the signal.

(vi) The signal-generating system shall respond automatically to an initiating event without requiring any human action to sound the signal.

(b) Design objectives.

(i) The signal-generating system shall be designed to incorporate components which enable the system to produce the desired signal each time it is activated within one-half second of activation.

(ii) The signal-generating system shall be provided with an automatically activated secondary power supply which is adequate to simultaneously power all emergency equipment to which it is connected, if operation during power failure is

necessary, except in those systems using batteries as the primary source of power.

(iii) All components of the signal-generating system shall be located to provide maximum practicable protection against damage in case of fire, explosion, corrosive atmosphere, or other environmental extremes consistent with adequate system performance.

(iv) The signal-generating system shall be designed with the minimum number of components necessary to make it function as intended, and should utilize components which do not require frequent servicing such as lubrication or cleaning.

(v) Where several activating devices feed activating information to a central signal generator, failure of any activating device shall not render the signal-generator system inoperable to activating information from the remaining devices.

(vi) The signal-generating system shall be designed to enhance the probability that alarm occurs only when immediate evacuation is warranted. The number of false alarms shall not be so great that the signal will come to be disregarded and shall be low enough to minimize personal injuries or excessive property damage that might result from such evacuation.

(c) Testing.

(i) Initial tests, inspections, and checks of the signal-generating system shall be made to verify that the fabrication and installation were made in accordance with design plans and specifications and to develop a thorough knowledge of the performance of the system and all components under normal and hostile conditions.

(ii) Once the system has been placed in service, periodic tests, inspections, and checks shall be made to minimize the possibility of malfunction.

(iii) Following significant alterations or revisions to the system, tests and checks similar to the initial installation tests shall be made.

(iv) Tests shall be designed to minimize hazards while conducting the tests.

(v) Prior to normal operation the signal-generating system shall be checked physically and functionally to assure reliability and to demonstrate accuracy and performance. Specific tests shall include:

(A) All power sources.

(B) Calibration and calibration stability.

(C) Trip levels and stability.

(D) Continuity of function with loss and return of required services such as AC or DC power, air pressure, etc.

(E) All indicators.

(F) Trouble indicator circuits and signals, where used.

(G) Air pressure (if used).

(H) Determine that sound level of the signal is within the limit of item (a)(ii) of this subsection at all points that require immediate evacuation.

(vi) In addition to the initial startup and operating tests, periodic scheduled performance tests and status checks must be made to insure that the system is at all times operating within design limits and capable of the required response. Specific periodic tests or checks or both shall include:

(A) Adequacy of signal activation device.

(B) All power sources.

(C) Function of all alarm circuits and trouble indicator circuits including trip levels.

(D) Air pressure (if used).

(E) Function of entire system including operation without power where required.

(F) Complete operational tests including sounding of the signal and determination that sound levels are adequate.

(vii) Periodic tests shall be scheduled on the basis of need, experience, difficulty, and disruption of operations. The entire system should be operationally tested at least quarterly.

(viii) All employees whose work may necessitate their presence in an area covered by the signal shall be made familiar with the actual sound of the signal—preferably as it sounds at their work location. Before placing the system into operation, all employees normally working in the area shall be made acquainted with the signal by actual demonstration at their work locations.

(8) Exceptions from posting requirements. Notwithstanding the provisions of subsection (6) of this section:

(a) A room or area is not required to be posted with a caution sign because of the presence of a sealed source, provided the radiation level 12 inches from the surface of the source container or housing does not exceed 5 millirem per hour.

(b) Rooms or other areas in onsite medical facilities are not required to be posted with caution signs because of the presence of patients containing radioactive material, provided that there are personnel in attendance who shall take the precautions necessary to prevent the exposure of any individual to radiation or radioactive material in excess of the limits established in the provisions of this section.

(c) Caution signs are not required to be posted at areas or rooms containing radioactive materials for periods of less than 8 hours: *Provided, That*

(i) The materials are constantly attended during such periods by an individual who shall take the precautions necessary to prevent the exposure of any individual to radiation or radioactive materials in excess of the limits established in the provisions of this section; and

(ii) Such area or room is subject to the employer's control.

(9) Exemptions for radioactive materials packaged for shipment. Radioactive materials packaged and labeled in accordance with regulations of the Department of Transportation published in 49 CFR Chapter I, are exempt from the labeling and posting requirements of this section during shipment, provided that the inside containers are labeled in accordance with the provisions of subsection (6) of this section.

(10) Instruction of personnel, posting.

(a) Employers regulated by the Nuclear Regulatory Commission shall be governed by 10 CFR Part 20 standards. Employers conducting business in Washington state shall be governed by the requirements of the laws and regulations of the state. All other employers shall be regulated by the following:

(b) All individuals working in or frequenting any portion of a radiation area shall be informed of the occurrence of radioactive materials or of radiation in such portions of the radiation area; shall be instructed in the safety problems

associated with exposure to such materials or radiation and in precautions or devices to minimize exposure; shall be instructed in the applicable provisions of this section for the protection of employees from exposure to radiation or radioactive materials; and shall be advised of reports of radiation exposure which employees may request pursuant to the regulations in this section.

(c) Each employer to whom this section applies shall post a current copy of its provisions and a copy of the operating procedures applicable to the work conspicuously in such locations as to insure that employees working in or frequenting radiation areas will observe these documents on the way to and from their place of employment, or shall keep such documents available for examination of employees upon request.

(11) Storage of radioactive materials. Radioactive materials stored in a nonradiation area shall be secured against unauthorized removal from the place of storage.

(12) Waste disposal. No employer shall dispose of radioactive material except as provided for in WAC 402-24-130.

(13) Notification of incidents.

(a) Immediate notification. Each employer shall immediately notify the industrial hygiene section, division of industrial safety and health for employees not protected by the Nuclear Regulatory Commission by means of 10 CFR Part 20; subsection (2)(b) of this section by telephone or telegraph of any incident involving radiation which may have caused or threatens to cause:

(i) Exposure of the whole body of any individual to 25 rems or more of radiation; exposure of the skin of the whole body of any individual to 150 rems or more of radiation; or exposure of the feet, ankles, hands, or forearms of any individual to 375 rems or more of radiation; or

(ii) The release of radioactive material in concentrations which, if averaged over a period of 24 hours, would exceed 5,000 times the limit specified for such materials in Table II of WAC 402-24-220, Appendix A.

(iii) A loss of 1 working week or more of the operation of any facilities affected; or

(iv) Damage to property in excess of \$100,000.

(b) Twenty-four hour notification. Each employer shall within 24 hours following its occurrence notify the industrial hygiene section, division of industrial safety and health, for employees not protected by the Nuclear Regulatory Commission by means of 10 CFR Part 20; subsection (2)(b) of this section, by telephone or telegraph of any incident involving radiation which may have caused or threatens to cause:

(i) Exposure of the whole body of any individual to 5 rems or more of radiation; exposure of the skin of the whole body of any individual to 30 rems or more of radiation; or exposure of the feet, ankles, hands, or forearms to 75 rems or more of radiation; or

(ii) A loss of 1 day or more of the operation of any facilities; or

(iii) Damage to property in excess of \$10,000.

(14) Reports of overexposure and excessive levels and concentrations.

(a) In addition to any notification required by subsection (13) of this section each employer shall make a report in writing within 30 days to the industrial hygiene section

division of industrial safety and health, for employees not protected by the Nuclear Regulatory Commission by means of 10 CFR Part 20; or under subsection (2)(b) of this section, of each exposure of an individual to radiation or concentrations of radioactive material in excess of any applicable limit in this section. Each report required under this subdivision shall describe the extent of exposure of persons to radiation or to radioactive material; levels of radiation and concentration of radioactive material involved, the cause of the exposure, levels of concentrations; and corrective steps taken or planned to assure against a recurrence.

(b) In any case where an employer is required pursuant to the provisions of this subsection to report to the industrial hygiene section, division of industrial safety and health, any exposure of an individual to radiation or to concentrations of radioactive material, the employer shall also notify such individual of the nature and extent of exposure. Such notice shall be in writing and shall contain the following statement: "You should preserve this report for future reference."

(15) Records.

(a) Every employer shall maintain records of the radiation exposure of all employees for whom personnel monitoring is required under subsection (5) of this section and advise each of his employees of his individual exposure on at least an annual basis.

(b) Every employer shall maintain records in the same units used in tables in subsection (2) of this section and WAC 402-24-220, Appendix A.

(16) Disclosure to former employee of individual employee's record.

(a) At the request of a former employee an employer shall furnish to the employee a report of the employee's exposure to radiation as shown in records maintained by the employer pursuant to subdivision (15)(a) of this section. Such report shall be furnished within 30 days from the time the request is made, and shall cover each calendar quarter of the individual's employment involving exposure to radiation or such lesser period as may be requested by the employee. The report shall also include the results of any calculations and analysis of radioactive material deposited in the body of the employee. The report shall be in writing and contain the following statement: "You should preserve this report for future reference."

(b) The former employee's request should include appropriate identifying data, such as social security number and dates and locations of employment.

(17) (Reserved)

(18) Radiation standards for mining.

(a) For the purpose of this subsection, a "working level" is defined as any combination of radon daughters in 1 liter of air which will result in the ultimate emission of 1.3×10^5 million electron volts of potential alpha energy. The numerical value of the "working level" is derived from the alpha energy released by the total decay of short-lived radon daughter products in equilibrium with 100 picocuries of radon 222 per liter of air. A working level month is defined as the exposure received by a worker breathing air at one working level concentration for 4-1/3 weeks of 40 hours each.

(b) Occupational exposure to radon daughters in mines shall be controlled so that no individual will receive an exposure of more than 2 working level months in any calendar quarter and no more than 4 working level months in any calendar year. Actual exposures shall be kept as far below these values as practicable.

(c)(i) For uranium mines, records of environmental concentrations in the occupied parts of the mine, and of the time spent in each area by each person involved in an underground work shall be established and maintained. These records shall be in sufficient detail to permit calculations of the exposures, in units of working level months, of the individuals and shall be available for inspection by the industrial hygiene section, division of safety and health or their authorized representatives.

(ii) For other than uranium mines and for surface workers in all mines, item (i) of this subdivision will be applicable: *Provided, however,* That if no environmental sample shows a concentration greater than 0.33 working level in any occupied part of the mine, the maintenance of individual occupancy records and the calculation of individual exposures will not be required.

(d)(i) At the request of an employee (or former employee) a report of the employee's exposure to radiation as shown in records maintained by the employer pursuant to subdivision (c) of this subsection shall be furnished to him. The report shall be in writing and contain the following statement:

"This report is furnished to you under the provisions of the state of Washington, Ionizing Radiation Safety and Health Standards (chapter 296-62 WAC). You should preserve this report for future reference."

(ii) The former employee's request should include appropriate identifying data, such as Social Security number and dates and locations of employment. See tables in WAC 402-24-220, Appendix A and 402-24-230, Appendix B.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 85-01-022 (Order 84-24), § 296-62-09004, filed 12/11/84; Order 75-15, § 296-62-09004, filed 4/18/75.]

WAC 296-62-09005 Nonionizing radiation. (1) Introduction. Employees shall be protected from exposure to hazardous levels of nonionizing radiation. Health standards have been established for ultraviolet, radiofrequency/microwave, and laser radiations which shall be used to promote a healthful working environment. These standards refer to levels of nonionizing radiation and represent conditions under which it is believed that nearly all workers may be repeatedly exposed day after day without adverse effects. They are based on the best available information from experimental studies. Because of the wide variations in individual susceptibility, exposure of an occasional individual at, or even below, the permissible limit, may result in discomfort, aggravation of a preexisting condition, or physiological damage.

(a) Permissible exposure limits (PELs) refer to a time weighted average (TWA) of exposure for an 8-hour work day within a 40-hour workweek. Exceptions are those limits which are given a ceiling value.

(b) These PELs should be interpreted and applied only by technically qualified persons.

(c) Ceiling value. There are nonionizing radiations which produce physiological responses from short intense exposure and the PELs for these radiations are more appropriately based on this particular hazard. Nonionizing radiations with this type of hazard are best controlled by a ceiling value which is a maximum level of exposure which shall not be exceeded.

(2) The employer shall establish and maintain a program for the control and monitoring of nonionizing radiation hazards. This program shall provide employees adequate supervision, training, facilities, equipment, and supplies, for the control and assessment of nonionizing radiation hazards.

(3) Radiofrequency/microwave radiation permissible exposure limits.

(a) Definition: "Partial body exposure" means the case in which only the hands and forearms or the feet and legs below the knee are exposed.

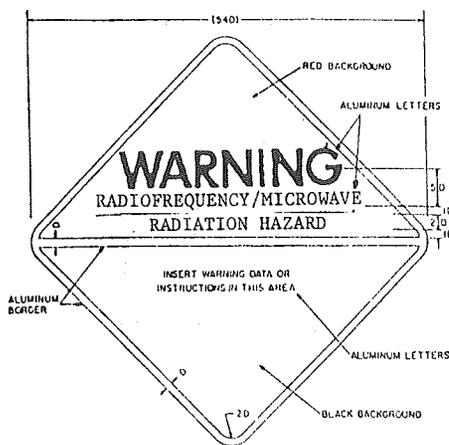
(b) Warning symbol.

(i) The warning symbol for radiofrequency/microwave radiation shall consist of a red isosceles triangle above an inverted black isosceles triangle, separated and outlined by an aluminum color border. The words "Warning - Radiofrequency/microwave radiation hazard" shall appear in the upper triangle. See Figure 1.

(ii) All areas where entry may result in an exposure to radiofrequency/microwave radiation in excess of the PEL shall have a warning symbol prominently displayed at their entrance.

(iii) American National Standard Safety Color Code for Marking Physical Hazards and the Identification of Certain Equipment, Z53.1-1953, shall be used for color specification. All lettering and the border shall be of aluminum color.

(iv) The inclusion and choice of warning information or precautionary instructions is at the discretion of the user. If such information is included it shall appear in the lower triangle of the warning symbol.



- Place handling and mounting instructions on reverse side.
- D = Scaling Unit.
- Lettering: Ratio of letter height to thickness of letter lines.

Upper triangle:	5 to 1 Large
	6 to 1 Medium
Lower triangle:	4 to 1 Small
	6 to 1 Medium
- Symbol is square, triangles are right-angle isosceles.

Figure 1

Radiofrequency/Microwave Radiation Hazard Warning Symbol

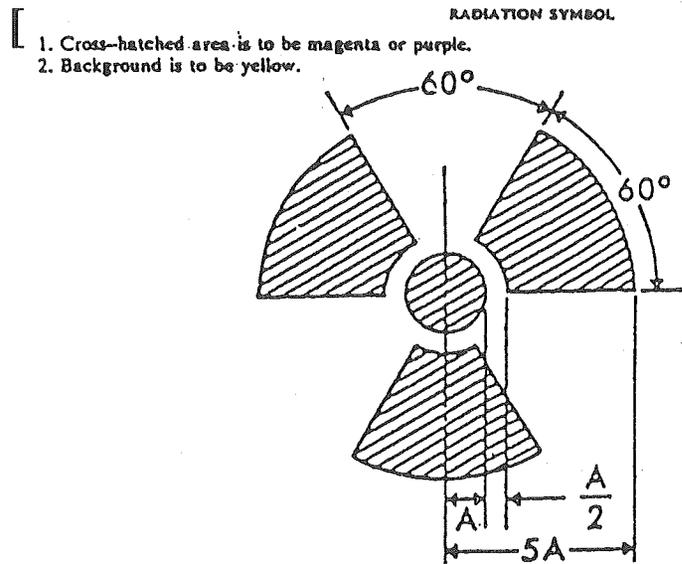


FIGURE G-10

(c) These PELs refer to radiofrequency/microwave radiation exposures in the frequency range of 300 kHz to 100 GHz. Based on current knowledge, it is believed that workers may be exposed at these PELs without adverse health effects.

(i) Table I gives the PELs in terms of the mean squared electric (E^2) and magnetic (H^2) field strengths and in terms of the equivalent plane-wave free-space power density, as a function of frequency.

(ii) The average exposure for any 6 minute (0.1 hour) period shall not exceed the PEL.

(iii) Measurements shall be made at distances of 5 cm or greater from any object.

(iv) For mixed or broadband fields at a number of frequencies for which there are different PELs, the fraction of the PEL incurred within each frequency interval shall be determined and the sum of these fractions shall not exceed unity.

(v) PELs given in Table I for frequencies between 300 kHz and 1 GHz may be exceeded for partial body exposures if the output power of the radiating device is 7 watts or less.

Table I. Radiofrequency/Microwave Radiation Permissible Exposure Limits (PELs).

Frequency(f)	Electric Field Strength Squared*		Magnetic Field Strength Squared*
	mW/cm^2	V^2/m^2	A^2/m^2
0.3 to 3 MHz	100	400,000	2.5
3 to 30 MHz	$900/f^2$	$4000(900/f^2)$	$0.025(900/f^2)$
30 to 300 MHz	1.0	4000	0.025
300 to 1500 MHz	$f/300$	$4000(f/300)$	$0.025(f/300)$
1.5 to 100 GHz	5.0	20,000	0.125

Note: f=frequency (MHz)

* Ceiling value

(4) Laser radiation permissible exposure limits.

(a) Definitions.

(i) "Diffuse reflection" means a change of the spatial distribution of a beam of radiation when it is reflected in many directions by a surface or medium.

(ii) "Specular reflection" means a mirrorlike reflection.

(iii) "Accessible radiation" means laser radiation to which human access is possible.

(b) All lasers and laser systems shall be classified in accordance with the Federal Laser Product Performance Standards (21 CFR 1040.10) or, if manufactured prior to August 2, 1976, in accordance with ANSI Z136.1-1980.

(i) Class I. Laser systems that are considered to be incapable of producing damaging radiation levels and are thereby exempt from control measures. This is a no hazard category.

(ii) Class II. Visible wavelength laser systems that have a low hazard potential because of the expected aversion response. There is some possibility of injury if stared at. This is a low hazard category.

(iii) Class III. Laser systems in which intrabeam viewing of the direct beam or specular reflections of the beam may be hazardous. This class is further subdivided into IIIa and IIIb. This is a moderate hazard category.

(iv) Class IV. Laser systems whose direct or diffusely reflected radiation may be hazardous and where the beam may constitute a fire hazard. Class IV systems require the use of controls that prevent exposure of the eye and skin to specular or diffuse reflections of the beam. This is a high hazard category.

(c) Warning signs and classification labels shall be prepared in accordance with 21 CFR 1040.10 when classifying lasers and laser systems, and ANSI Z136.1 - 1980 when using classified lasers and laser systems. All signs and labels shall be conspicuously displayed.

(i) The signal word "CAUTION" shall be used with all signs and labels associated with Class II and Class IIIa lasers and laser systems.

(ii) The signal word "DANGER" shall be used with all signs and labels associated with Class IIIb and Class IV lasers and laser systems.

(d) Personal protective equipment shall be provided at no cost to the employee and shall be worn whenever operational conditions or maintenance of lasers may result in a potentially hazardous exposure.

(i) Protective eyewear shall be specifically designed for protection against radiation of the wavelength and radiant energy of the laser or laser system. Ocular exposure shall not exceed the recommendations of ANSI Z136.1 - 1980.

(ii) For Class IV lasers and laser systems protective eyewear shall be worn for all operational conditions or maintenance which may result in exposures to laser radiation.

(e) Engineering controls shall be used whenever feasible to reduce the accessible radiation levels for Class IV lasers and laser systems to a lower classification level. These controls may include, but are not limited to: Protective housings, interlocks, optical system attenuators, enclosed beam paths, remote controls, beam stops, and emission delays with audible warnings.

(f) All employees who may be exposed to laser radiation shall receive laser safety training. The training shall

ensure that the employees are knowledgeable of the potential hazards and control measures for the laser equipment in use.

(5) Ultraviolet radiation.

(a) These permissible exposure limits refer to ultraviolet radiation in the spectral region between 200 and 400 nanometer (nm) and represent conditions under which it is believed that nearly all workers may be repeatedly exposed without adverse effect. These values for exposure of the eye or the skin apply to ultraviolet radiation from arcs, gas, and vapor discharges, and incandescent sources, but do not apply to ultraviolet lasers or solar radiation. These levels should not be used for determining exposure of photosensitive individuals to ultraviolet radiation. These values shall be used in the control of exposure to continuous sources where the exposure relation shall not be less than 0.1 sec.

(b) The permissible exposure limit for occupational exposure to ultraviolet radiation incident upon skin or eye where irradiance values are known and exposure time is controlled are as follows:

(i) For the near ultraviolet spectral region (320 to 400 nanometer (nm)), total irradiance incident upon the unprotected skin or eye shall not exceed 1.0 milliwatt/sq. centimeter for periods greater than 10^3 seconds (approximately 16 minutes) and for exposure times less than 10^3 seconds shall not exceed one Joule/sq. centimeter.

(ii) For the actinic ultraviolet spectral region (200 - 315 nm), radiant exposure incident upon the unprotected skin or eye shall not exceed the values given in Table 4 within an 8-hour period.

(iii) To determine the effective irradiance of a broadband source weighted against the peak of the spectral effectiveness curve (270 nanometer (nm)), the following weighting formulas shall be used.

$$E_{\text{eff}} = \sum (E\text{-Lambda}) (S\text{-Lambda}) (\Delta\text{-Lambda})$$

Where:

E_{eff}	=	effective irradiance relative to a monochromatic source at 270nm
E-Lambda	=	spectral irradiance in Watts/sq. centimeter/nanometer.
S-Lambda	=	relative spectral effectiveness (unitless)
Delta-Lambda	=	band width in nanometers

(iv) Permissible exposure time in seconds for exposure to actinic ultraviolet radiation incident upon the unprotected skin or eye may be computed by dividing 0.003 Joules/sq. centimeter by E_{eff} in Watts/sq. centimeter. The exposure time may also be determined using Table 5 which provides exposure times corresponding to effective irradiances in $\mu\text{W}/\text{cm}^2$.

TABLE 4

Wavelength nanometer	PEL millijoules/sq. centimeters	Relative Spectral Effectiveness S Lambda
200	100	0.03
210	40	0.075
220	25	0.12

230	16	0.19
240	10	0.30
250	7.0	0.43
254	6.0	0.5
260	4.6	0.65
270	3.0	1.0
280	3.4	0.88
290	4.7	0.64
300	10	0.30
305	50	0.06
310	200	0.015
315	1000	0.003

TABLE 5

Duration of Exposure Per Day	Effective Irradiance E_{eff} ($\mu\text{W}/\text{cm}^2$)
8 hrs.	0.1
4 hrs.	0.2
2 hrs.	0.4
1 hr.	0.8
1/2 hr.	1.7
15 min.	3.3
10 min.	5
5 min.	10
1 min.	50
30 sec.	100
10 sec.	300
1 sec.	3,000
0.5 sec.	6,000
0.1 sec.	30,000

TABLE 6

Densities and Transmissions (in Percent); also Tolerances in Densities and Transmissions of Various Shades of Glasses for Protection Against Injurious Rays

(Shades 3 to 8, inclusive, are for use in goggles, shades 10 to 14, inclusive, for welder's helmets and face shields)

[CODIFICATION NOTE: The graphic presentation of this table has been varied slightly in order that it would fall within the printing specifications for the Washington Administrative Code. In the following table, the original table had columns relating to (1) "Optical Density" which is now "Part 1," (2) "Total Visible Luminous Transmittance" and "Maximum total Infrared" which are now "Part 2," (3) "Maximum Ultraviolet Transmission" which is now "Part 3," and (4) "Recommended Uses" which is now "Part 4." These columns were all positioned side by side. In the new WAC format these are split up into four separate tables.]

TABLE 6—Part 1

Shade No.	Optical Density		
	Minimum [C]O.D.	Standard O.D.	Maximum O.D.
3.0	.64	.857	1.06

4.0	1.07	1.286	1.49
5.0	1.50	1.714	1.92
6.0	1.93	2.143	2.35
7.0	2.36	2.572	2.78
8	2.79	3.000	3.21
9	3.22	3.429	3.63
10	3.64	3.857	4.06
11	4.07	4.286	4.49
12	4.50	4.715	4.92
13	4.93	5.143	5.35
14	5.36	5.571	5.78

TABLE 6—Part 2

Shade No.	Total Visible Luminous Transmittance			Maximum Total Infrared %
	Maximum %	Standard %	Minimum %	
3.0	22.9	13.9	8.70	9.0
4.0	8.51	5.18	3.24	5.0
5.0	3.16	1.93	1.20	2.5
6.0	1.18	.72	.45	1.5
7.0	.44	.27	.17	1.3
8	.162	.100	.062	1.0
9	.060	.037	.023	.8
10	.0229	.0139	.0087	.6
11	.0085	.0052	.0033	.5
12	.0032	.0019	.0012	.5
13	.00118	.00072	.00045	.4
14	.00044	.00027	.00017	.3

TABLE 6—Part 3

Maximum Ultraviolet Transmission

Shade No.	313mu %	334mu %	365mu %	405mu %
3.0	.2	.2	.5	1.0
4.0	.2	.2	.5	1.0
5.0	.2	.2	.2	.5

6.0	.1	.1	.1	.5
7.0	.1	.1	.1	.5
8	.1	.1	.1	.5
9	.1	.1	.1	.5
10	.1	.1	.1	.5
11	.05	.05	.05	.1
12	.05	.05	.05	.1
13	.05	.05	.05	.1
14	.05	.05	.05	.1

TABLE 6—Part 4

Shade No.	Recommended Uses
3.0	Glare of reflected sunlight from snow, water, sand, etc., stray light from cutting and welding metal pouring and work around furnaces and foundries.
4.0	
5.0	Light acetylene cutting and welding; light electric spot welding.
6.0	
7.0	Acetylene cutting and medium welding; arc welding up to 30 amperes.
8	
9	Heavy acetylene welding; arc cutting and welding between 30 and 75 amperes.
10	
11	Arc cutting and welding between 75 and 200 amperes.
12	
13	Arc cutting and welding between 200 and 400 amperes.
14	Arc cutting and welding above 400 amperes.

- a. American Standard Safety Code for the Protection of Heads, Eyes, and Respiratory Organs.
- b. Standard density is defined as the logarithms (base 10) of the reciprocal of the transmission. Shade number is determined by the density according to the relations:

Shade number = $7/3$ density + 1 with tolerances as given in the table.

Note: Safety glasses are available with lenses which protect the eyes against ultraviolet radiation.

[Statutory Authority: Chapter 49.17 RCW and RCW 49.17.040, [49.17].050 and [49.17].060. 92-22-067 (Order 92-06), § 296-62-09005, filed 10/30/92, effective 12/8/92. Statutory Authority: RCW 49.17.040 and 49.17.050. 85-01-022 (Order 84-24), § 296-62-09005, filed 12/11/84. Statutory Authority: RCW 49.17.040. 80-16-029 (Order 80-22), § 296-62-09005, filed 10/31/80. Statutory Authority: RCW 49.17.040, 49.17.050 and 49.17.240. 80-11-010

(Order 80-14), § 296-62-09005, filed 8/8/80; Order 73-3, § 296-62-09005, filed 5/7/73.]

Reviser's note: RCW 34.05.395 requires the use of underlining and deletion marks to indicate amendments to existing rules, and deems ineffectual changes not filed by the agency in this manner. The bracketed material in the above section does not appear to conform to the statutory requirement.

WAC 296-62-09007 Pressure. (1) Employees exposed to pressures above normal atmospheric pressure which may produce physiological injury shall adhere to decompression schedules or other tables as are or may be adopted by the department of labor and industries: for example, state of Washington "safety standards for compressed air work" and "safety standards for commercial diving operations." The employer shall provide and supervise the use of decompression equipment and schedules in accordance with applicable requirements.

(2) If no specific requirements prevail for an unusual condition, a plan based on the recommendations of professionally qualified advisors, experienced with hazards associated with such exposures, shall be followed by both the employer and employee.

[Statutory Authority: Chapter 49.17 RCW. 91-11-070 (Order 91-01), § 296-62-09007, filed 5/20/91, effective 6/20/91; Order 73-3, § 296-62-09007, filed 5/7/73.]

WAC 296-62-09009 Vibration. Reasonable precautions shall be taken to protect workmen against the hazardous effects of unavoidable exposure to vibrations.

[Order 73-3, § 296-62-09009, filed 5/7/73.]

WAC 296-62-09013 Temperature, radiant heat, or temperature-humidity combinations. (1) Workmen subjected to temperature extremes, radiant heat, humidity, or air velocity combinations which, over a period of time, are likely to produce physiological responses which are harmful shall be afforded protection by use of adequate controls, methods or procedures, or protective clothing. This shall not be construed to apply to normal occupations under atmospheric conditions which may be expected in the area except that special provisions which are required by other regulations for certain areas or occupations shall prevail.

[Order 73-3, § 296-62-09013, filed 5/7/73.]

PART K—HEARING CONSERVATION

WAC 296-62-09015 Hearing conservation. The employer shall administer a continuing effective hearing conservation program, as described in WAC 296-62-09015 through 296-62-09055 whenever employee noise exposures equal or exceed an 8-hour time-weighted average (TWA) sound level of 85 decibels (dB) measured on the A-scale weighting at slow response or, equivalently, a noise dose of fifty percent. For purposes of the hearing conservation program, employee noise exposures shall be computed in accordance with WAC 296-62-09055, Appendix E: Noise exposure computation, without regard to any attenuation provided by the use of personal protective equipment.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-62-09015, filed 11/30/83; 82-03-023 (Order 82-1), § 296-62-09015, filed 1/15/82.]

WAC 296-62-09017 Definitions. These definitions apply to the following terms as used in WAC 296-62-09015 through 296-62-09055.

(1) **Audiogram** - A chart, graph, or table resulting from an audiometric test showing an individual's hearing threshold levels as a function of frequency.

(2) **Audiologist** - A professional, specializing in the study and rehabilitation of hearing, who is certified by the American Speech, Hearing, and Language Association or licensed by a state board of examiners.

(3) **Baseline audiogram** - The audiogram against which future audiograms are compared.

(4) **Criterion sound level** - A sound level of 90 decibels.

(5) **Decibel (dB)** - Unit of measurement of sound level.

(6) **Hertz (Hz)** - Unit of measurement of frequency, numerically equal to cycles per second.

(7) **Impulsive or impact noise** - Noise levels which involve maxima at intervals greater than one second. Where the intervals are less than one second, the noise levels shall be considered continuous.

(8) **Medical pathology** - A disorder or disease. For purposes of this regulation, a condition or disease affecting the ear, which should be treated by a physician specialist.

(9) **Noise dose** - The ratio, expressed as a percentage, of (a) the time integral, over a stated time or event, of the 0.6 power of the measured SLOW exponential time-averaged, squared A-weighted sound pressure and (b) the product of the criterion duration (8 hours) and the 0.6 power of the squared sound pressure corresponding to the criterion sound level (90 dB).

(10) **Noise dosimeter** - An instrument that integrates a function of sound pressure over a period of time in such a manner that it directly indicates a noise dose.

(11) **Otolaryngologist** - A physician specializing in diagnosis and treatment of disorders of the ear, nose and throat.

(12) **Representative exposure** - Measurements of an employee's noise dose or 8-hour time-weighted average sound level that the employer deems to be representative of the exposure of other employees in the workplace.

(13) **Standard threshold shift** - A hearing level change, relative to the baseline audiogram, of an average of 10 dB or more at 2000, 3000, and 4000 Hz in either ear.

(14) **Sound level** - Ten times the common logarithm of the ratio of the the square of the measured A-weighted sound pressure to the square of the standard reference pressure of 20 micropascals. Unit: Decibels (dB). For use with this regulation, SLOW time response, in accordance with ANSI S1.4-1971 (R1976), is required unless specifically specified otherwise.

(15) **Sound level meter** - An instrument for the measurement of sound level.

(16) **Time-weighted average sound level** - That sound level, which if constant over an 8-hour period, would result in the same noise dose as if measured in the time varying noise level environment.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-62-09017, filed 11/30/83; 82-03-023 (Order 82-1), § 296-62-09017, filed 1/15/82.]

WAC 296-62-09019 Monitoring. (1) When reasonable information indicates that any employee's exposure may equal or exceed an 8-hour time-weighted average of 85 dBA, the employer shall obtain individual or representative exposure measurements for all employees who may be exposed at or above that level.

(2) The sampling strategy shall be designed to identify all employees required to be included in the hearing conservation program and to enable the proper selection of hearing protectors.

(3) Where circumstances such as high worker mobility, significant variations in sound level, or a significant component of impulse noise exist, the employer shall use representative personal sampling to comply with the monitoring requirements of this section unless the employer can establish that area sampling produces equivalent results.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-62-09019, filed 11/30/83; 82-03-023 (Order 82-1), § 296-62-09019, filed 1/15/82.]

WAC 296-62-09021 Method of noise measurement.

(1) Noise dosimeters which comply, as a minimum, with the provisions of subdivision (1)(a) of this section or sound level meters which comply, as a minimum, with the provisions of subdivision (1)(b) of this section shall be used whenever employee exposures are evaluated for the purpose of complying with WAC 296-62-09015 through 296-62-09055.

(a) **Dosimeters.** Dosimeters shall meet the Class 2A-90/80-5 requirements of the American National Standard Specification for Personal Noise Dosimeters, S1.25-1978.

(b) **Sound level meters.** Sound level meters shall meet the Type 2 requirements of the American National Standard Specification for Sound Level Meters, S1.4-1971 (R1976).

(2) All continuous, intermittent, and impulsive sound levels from 80 dBA to 130 dBA shall be integrated into the exposure computation.

(3) Monitoring shall be repeated whenever a change in production, process, equipment or controls increases noise exposures to the extent that:

(a) Additional employees may be exposed at or above an 8-hour time-weighted average of 85 dBA; or

(b) The attenuation provided by hearing protectors being used by employees may be rendered inadequate to meet the requirements of WAC 296-62-09033.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-62-09021, filed 11/30/83; 82-03-023 (Order 82-1), § 296-62-09021, filed 1/15/82.]

WAC 296-62-09023 Calibration of monitoring equipment. Dosimeters and sound level meters used to monitor employee noise exposure shall be calibrated using the instrument manufacturer's calibration instructions before and after each day's use.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-62-09023, filed 11/30/83; 82-03-023 (Order 82-1), § 296-62-09023, filed 1/15/82.]

WAC 296-62-09024 Employee notification. The employer shall notify each employee exposed at or above an 8-hour time-weighted average of 85 dBA of the results of the monitoring.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-62-09024, filed 11/30/83.]

WAC 296-62-09025 Observation of monitoring. The employer shall provide affected employees or their representatives with an opportunity to observe any measurements of employee noise exposure which are conducted pursuant to WAC 296-62-09019.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 82-03-023 (Order 82-1), § 296-62-09025, filed 1/15/82.]

WAC 296-62-09026 Noise control. (1) Whenever employee noise exposures equal or exceed an 8-hour time-weighted average of 90 dBA, feasible administrative or engineering controls shall be utilized.

(2) Upon request, the employer shall prepare and submit a written compliance plan to the director or his/her designee. This plan must include a description of the manner in which compliance will be achieved with respect to cited violations of WAC 296-62-09026(1) and shall include proposed abatement methods, anticipated completion dates, and provision for progress reports to the director or his/her designee.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-62-09026, filed 11/30/83.]

WAC 296-62-09027 Audiometric testing program.

(1) The employer shall establish and maintain a mandatory audiometric testing program as provided in this section for all employees whose exposures equal or exceed an 8-hour time-weighted average of 85 dBA.

(2) The program shall be provided at no cost to employees.

(3) Audiometric tests shall be performed by a licensed or certified audiologist, otolaryngologist, or other qualified physician, or by a technician who is certified by the Council of Accreditation in Occupational Hearing Conservation. A technician who performs audiometric tests must be responsible to an audiologist, otolaryngologist or other qualified physician.

(4) All audiograms obtained pursuant to this section shall meet the requirements of WAC 296-62-09047, Appendix A: Audiometric measuring instruments.

(5) Baseline audiogram.

(a) Prior to or within 180 days after an employee's first exposure to noise at or above a time-weighted average of 85 dBA, the employer shall establish for each employee so exposed a valid baseline audiogram against which subsequent audiograms can be compared. Employers who utilize mobile test units are allowed up to one year to obtain a valid baseline audiogram for each exposed employee, provided that each employee so exposed shall be trained and shall wear suitable hearing protectors in accordance with WAC 296-62-09015 through 296-62-09055.

(b) Testing to establish a baseline audiogram shall be preceded by at least 14 hours without exposure to workplace noise.

This may be accomplished by use of hearing protectors; however, the employer shall notify employees of the need to avoid high levels of nonoccupational noise exposure during the 14-hour period immediately preceding the audiometric examination.

(6) Annual audiogram.

(a) At least annually (i.e. every 12-month interval) after obtaining the baseline audiogram, the employer shall obtain a new audiogram for each employee exposed at or above a time-weighted average of 85 dBA.

(b) Annual audiometric testing may be conducted at any time during the workshift.

(7) Evaluation of audiogram.

(a) Each employee's annual audiogram shall be compared to that employee's baseline audiogram to determine if a standard threshold shift has occurred. This comparison may be made by a certified audiometric technician.

(b) If the annual audiogram indicates that an employee has suffered a standard threshold shift, the employer may obtain a retest within 30 days and consider the results of the retest as the annual audiogram.

(c) An audiologist, otolaryngologist or other qualified physician shall review audiograms which indicate a standard threshold shift to determine whether there is need for further evaluation. The employer shall provide to the person performing this evaluation the following information:

(i) A copy of the requirements for hearing conservation as set forth in WAC 296-62-09015 through 296-62-09055;

(ii) The baseline audiogram and most recent audiogram of the employee to be evaluated;

(iii) Measurements of background sound pressure levels in the audiometric test room as required in WAC 296-62-09049, Appendix B: Audiometric test rooms; and

(iv) Records of audiometer calibrations required by WAC 296-62-09029(5).

(d) Inform each employee of the results of his/her audiometric test and whether or not there has been a hearing level decrease or improvement since his/her previous test.

(8) Follow-up procedures. If a comparison of the annual audiogram to the baseline audiogram indicates a standard threshold shift, the employer shall ensure that the following steps are taken:

(a) Employees not using hearing protectors shall be fitted with hearing protectors, trained in their use and care, and required to use them.

(b) Employees already using hearing protectors shall be refitted and retrained in the use of hearing protectors and provided with hearing protectors offering greater attenuation if necessary.

(c) Inform the employee in writing, within 21 days of the determination, of the existence of a standard threshold shift;

(d) Refer the employee, at no cost to the employee, for a clinical audiological evaluation or an otological examination, as appropriate, if additional testing is necessary or if the employer suspects that a medical pathology of the ear (as defined in WAC 296-62-09017) is caused or aggravated by the wearing of hearing protectors; and

(e) Inform the employee of the need for an otological examination if a medical pathology of the ear which is unrelated to the use of hearing protectors is suspected.

(9) Revised baseline. An annual audiogram may be substituted for the baseline audiogram when, in the judgment of the audiologist, otolaryngologist or other qualified physician who is evaluating the audiogram:

(a) The standard threshold shift revealed by the audiogram is persistent; or

(b) The hearing threshold shown in the annual audiogram indicates significant improvement over the baseline audiogram.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-62-09027, filed 11/30/83; 82-03-023 (Order 82-1), § 296-62-09027, filed 1/15/82.]

WAC 296-62-09029 Audiometric test requirements.

(1) Audiometric tests shall be pure tone, air conduction, hearing threshold examinations, with test frequencies including as a minimum 500, 1000, 2000, 3000, 4000, and 6000 Hz. Tests at each frequency shall be taken separately for each ear.

(2) Audiometric tests shall be conducted with audiometers (including microprocessor audiometers) that meet the specifications of, and are maintained and used in accordance with, American National Standard Specification for Audiometers, S3.6-1969(R1973).

(3) Pulsed-tone and self-recording audiometers, if used, shall meet the requirements specified in WAC 296-62-09047, Appendix A: Audiometric measuring instruments.

(4) Audiometric examinations shall be administered in a room meeting the requirements listed in WAC 296-62-09049, Appendix B: Audiometric test rooms.

(5) Audiometer calibration.

(a) The functional operation of the audiometer shall be checked before each day's use by testing a person with known, stable hearing thresholds, and by listening to the audiometer's output to make sure that the output is free from distorted or unwanted sounds. Deviations of 10 dB or greater shall require an acoustic calibration.

(b) Audiometer calibration shall be checked acoustically at least annually in accordance with WAC 296-62-09051, Appendix C: Acoustic calibration of audiometers. Test frequencies below 500 Hz and above 6000 Hz may be omitted from this check.

(c) An exhaustive calibration shall be performed at least every two years in accordance with sections 4.1.2; 4.1.3; 4.1.4.3; 4.2; 4.4.1; 4.4.2; 4.4.3; and 4.5 of the American National Standard Specification for Audiometers, S3.6-1969(R1973). Test frequencies below 500 Hz and above 6000 Hz may be omitted from the calibration.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-62-09029, filed 11/30/83; 82-03-023 (Order 82-1), § 296-62-09029, filed 1/15/82.]

WAC 296-62-09031 Hearing protectors. (1) Employers shall make hearing protectors available to all employees exposed to a time-weighted average of 85 dBA or greater at no cost to the employees. Hearing protectors shall be replaced as necessary.

(2) Employers shall ensure that hearing protectors are worn:

(a) By any employee who is exposed to an 8-hour time-weighted average of 85 dBA or greater; or

(b) By any employee who is exposed to noise above 115 dBA; or

(c) By any employee who is exposed to any impulsive or impact noise measured at or above 140 dB peak using an impulse sound level meter set to either the linear or C-scale.

(3) Employees shall be given the opportunity to select their hearing protectors from at least two different types (i.e. molded, self-molded, custom molded, or ear muffs) of suitable hearing protectors provided by the employer.

(4) The employer shall provide training in the use and care of all hearing protectors provided to employees.

(5) The employer shall ensure proper initial fitting and supervise the correct use of all hearing protectors.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-62-09031, filed 11/30/83; 82-13-045 (Order 82-22), § 296-62-09031, filed 6/11/82; 82-03-023 (Order 82-1), § 296-62-09031, filed 1/15/82.]

WAC 296-62-09033 Hearing protector attenuation.

(1) The employer shall evaluate hearing protector attenuation for the specific noise environments in which the protector will be used by one of the methods described in WAC 296-62-09053, Appendix D: Methods for estimating the adequacy of hearing protector attenuation, or by other methods if approved by the director.

(2) Hearing protectors must attenuate employee exposure at least to a time-weighted average of 85 dBA or below.

(3) The adequacy of hearing protector attenuation shall be re-evaluated whenever employee noise exposures increase to the extent that the hearing protectors provided may no longer provide adequate attenuation. The employer shall provide more effective hearing protectors where necessary.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-62-09033, filed 11/30/83; 82-13-045 (Order 82-22), § 296-62-09033, filed 6/11/82; 82-03-023 (Order 82-1), § 296-62-09033, filed 1/15/82.]

WAC 296-62-09035 Training program. (1) The employer shall institute a training program for all employees who are exposed to noise at or above an 8-hour time-weighted average of 85 dBA, and shall ensure employee participation in such program.

(2) The training program shall be repeated annually for each employee included in the hearing conservation program. Information provided in the training program shall be updated to be consistent with changes in protective equipment and work processes.

(3) The employer shall ensure that each employee is informed of the following:

(a) The effects of noise on hearing;

(b) The purpose of hearing protectors, the advantages, disadvantages, and attenuation of various types, and instructions on selection, fitting, use, and care; and

(c) The purpose of audiometric testing, and an explanation of the test procedures.

(d) The right to access to records as specified in WAC 296-62-09041(5).

(4) A written description of the training program instituted shall be maintained by each employer.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-62-09035, filed 11/30/83; 82-03-023 (Order 82-1), § 296-62-09035, filed 1/15/82.]

WAC 296-62-09037 Access to information and training materials. (1) The employer shall make available to affected employees or their representatives copies of this standard and shall also post a copy in the workplace.

(2) The employer shall provide to affected employees any informational materials pertaining to this standard that are supplied to the employer by the director.

(3) The employer shall provide, upon request, all materials related to the employer's training and education program pertaining to this standard to the director.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 82-03-023 (Order 82-1), § 296-62-09037, filed 1/15/82.]

WAC 296-62-09039 Warning signs. (1) Signs shall be posted at entrances to or on the periphery of all well defined work areas in which employees may be exposed at or above 115 dBA.

(2) Warning signs shall clearly indicate that the area is a high noise area and that hearing protectors are required.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-62-09039, filed 11/30/83; 82-03-023 (Order 82-1), § 296-62-09039, filed 1/15/82.]

WAC 296-62-09041 Recordkeeping. (1) Exposure measurements. The employer shall maintain an accurate record of all employee exposure measurements required by this section.

(2) Audiometric tests.

(a) The employer shall retain a legible copy of all employee audiograms obtained pursuant to WAC 296-62-09027.

(b) This record shall include:

(i) Name and job classification of the employee;

(ii) Date of the audiogram;

(iii) The examiner's name;

(iv) Date of the last acoustic or exhaustive calibration of the audiometer; and

(v) Employee's most recent noise exposure assessment.

(3) Audiometric test rooms. The employer shall maintain accurate records of the measurements of the background sound pressure levels in audiometric test rooms.

(4) Record retention. The employer shall retain records required in this section for at least the following periods:

(a) Noise exposure measurement records shall be retained for two years.

(b) Audiometric test records shall be retained for the duration of the affected employee's employment.

(5) Access to records. All records required by this section shall be provided upon request to employees, former employees, representatives designated by the individual employee, and the director. The provisions of WAC 296-62-05201 through 296-62-05209 and 296-62-05213 through 296-62-05217 apply to access to records under this section.

(6) Transfer of records. If the employer ceases to do business, the employer shall transfer to the successor employer all records required to be maintained by this section, and the successor employer shall retain them for the remainder of the period prescribed in WAC 296-62-09041(4).

[Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-62-09041, filed 11/30/83; 82-03-023 (Order 82-1), § 296-62-09041, filed 1/15/82.]

WAC 296-62-09043 Appendices. WAC 296-62-09047, 296-62-09049, 296-62-09051, and 296-62-09053 and 296-62-09055, Appendices A, B, C, D, and E are incorporated as part of this section and the contents of these appendices are mandatory.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-62-09043, filed 11/30/83; 82-03-023 (Order 82-1), § 296-62-09043, filed 1/15/82.]

WAC 296-62-09045 Effective dates. (1) WAC 296-62-09015 through 296-62-09053 shall become effective 60 days after filing with the code reviser, unless otherwise noted below.

(2) Monitoring conducted pursuant to WAC 296-62-09019 shall be completed no later than 180 days from the effective date of the standard.

(3) Baseline audiograms required by WAC 296-62-09027 shall be completed no later than December 31, 1982.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 82-03-023 (Order 82-1), § 296-62-09045, filed 1/15/82.]

WAC 296-62-09047 Appendix A—Audiometric measuring instruments. (1) In the event that pulsed-tone audiometers are used, they shall have a tone on-time of at least 200 milliseconds.

(2) Self-recording audiometers shall comply with the following requirements:

(a) The chart upon which the audiogram is traced shall have lines at positions corresponding to all multiples of 10 dB hearing level within the intensity range spanned by the audiometer. The lines shall be equally spaced and shall be separated by at least 1/4 inch. Additional increments are optional. The audiogram pen tracings shall not exceed 2 dB in width.

(b) It shall be possible to set the stylus manually at the 10dB increment lines for calibration purposes.

(c) The slewing rate for the audiometer attenuator shall not be more than 6 dB/sec except that an initial slewing rate greater than 6 dB/sec is permitted at the beginning of each new test frequency, but only until the second subject response.

(d) The audiometer shall remain at each required test frequency for 30 seconds (± 3 seconds). The audiogram shall be clearly marked at each change of frequency and the actual frequency change of the audiometer shall not deviate from the frequency boundaries marked on the audiogram by more than ± 3 seconds.

(e) It must be possible at each test frequency to place a horizontal line segment parallel to the time axis on the audiogram, such that the audiometric tracing crosses the line

segment at least six times at the test frequency. At each test frequency the threshold shall be the average of the midpoints of the tracing excursions.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-62-09047, filed 11/30/83; 82-03-023 (Order 82-1), § 296-62-09047, filed 1/15/82.]

WAC 296-62-09049 Appendix B—Audiometric test rooms. Rooms used for audiometric testing shall not have background sound pressure levels exceeding those in Table B-1 when measured by equipment conforming at least to the Type 2 requirements of American National Standard Specification for Sound Level Meters, S1.4-1971 (R1976), and to the Class II requirements of American National Standard Specification for Octave, Half-Octave, and Third-Octave Band Filter Sets, S1.11-1971 (R1976).

TABLE B-1 - Maximum Allowable Octave-Band Sound Pressure Levels for Audiometric Test Rooms.

Octave-band center frequency (Hz)	500	1000	2000	4000	8000
Sound pressure level (dB)	40	40	47	57	62

[Statutory Authority: RCW 49.17.040 and 49.17.050. 82-03-023 (Order 82-1), § 296-62-09049, filed 1/15/82.]

WAC 296-62-09051 Appendix C—Acoustic calibration of audiometers. Audiometer calibration shall be checked acoustically, at least annually, according to the procedures described in this Appendix. The equipment necessary to perform these measurements is a sound level meter, octave-band filter set, and a National Bureau of Standards 9A coupler. In making these measurements, the accuracy of the calibrating equipment shall be sufficient to determine that the audiometer is within the tolerance permitted by American National Standard Specifications for Audiometers, S3.6-1969(R1973).

(1) Sound pressure output check.

(a) Place the earphone coupler over the microphone of the sound level meter and place the earphone on the coupler.

(b) Set the audiometer's hearing threshold level (HTL) dial to 70 dB.

(c) Measure the sound pressure level of the tones at each test frequency from 500 Hz through 6000 Hz for each earphone.

(d) At each frequency the readout on the sound level meter should correspond to the levels in Table C-1 or Table C-2, as appropriate, for the type of earphone, in the column entitled "sound level meter reading."

(2) Linearity check.

(a) With the earphone in place, set the frequency to 1000 Hz and the HTL dial on the audiometer to 70 dB.

(b) Measure the sound levels in the coupler at each 10dB decrement from 70 dB to 10 dB, noting the sound level meter reading at each setting.

(c) For each 10dB decrement on the audiometer the sound level meter should indicate a corresponding 10 dB decrease.

(d) This measurement may be made electrically with a voltmeter connected to the earphone terminals.

(1997 Ed.)

(3) Tolerances.

When any of the measured sound levels deviate from the levels in Table C-1 or Table C-2 by ± 3 dB at any test frequency between 500 and 3000 Hz, 4 dB at 4000 Hz, or 5 dB at 6000 Hz, an exhaustive calibration is required.

Table C-1 - Reference threshold levels for telephonics - TDH-39 earphones

Frequency, Hz	Reference threshold level for TDH-39 earphones, dB	Sound level meter reading, dB
500	11.5	81.5
1000	7	77
2000	9	79
3000	10	80
4000	9.5	79.5
6000	15.5	85.5

Table C-2 - Reference threshold levels for telephonics - TDH-49 Earphones

Frequency, Hz	Reference threshold level for TDH-49 earphones, dB	Sound level meter reading, dB
500	13.5	83.5
1000	7.5	77.5
2000	11	81.0
3000	9.5	79.5
4000	10.5	80.5
6000	13.5	83.5

[Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-62-09051, filed 11/30/83; 82-13-045 (Order 82-22), § 296-62-09051, filed 6/11/82; 82-03-023 (Order 82-1), § 296-62-09051, filed 1/15/82.]

WAC 296-62-09053 Appendix D—Methods for estimating the adequacy of hearing protector attenuation.

(1) Hearing protector attenuation must be sufficient to reduce employee exposure to a TWA of 85 dBA.

(2) The most convenient method to use is the noise reduction rating (NRR) developed by the Environmental Protection Agency (EPA). According to EPA regulation, the NRR must be shown on the hearing protector package. The NRR is then related to an individual worker's noise environment in order to assess the adequacy of the attenuation of a given hearing protector. This appendix describes two methods of using the NRR to determine whether a particular hearing protector provides adequate protection within a given exposure environment. Selection between the two procedures is dependent upon the employer's noise measuring instruments.

(3) When using the NRR to assess hearing protector adequacy, one of the following methods must be used:

(a) When using a dosimeter that is capable of making A-weighted measurements:

(i) Convert the A-weighted dose to TWA.

(ii) Subtract 7 dB from the NRR.

(iii) Subtract the remainder from the A-weighted TWA to obtain the estimated A-weighted TWA under the ear protector.

(b) When using a sound level meter set to the A-weighting network:

(i) Obtain the employee's A-weighted TWA.

(ii) Subtract 7 dB from the NRR, and subtract the remainder from the A-weighted TWA to obtain the estimated A-weighted TWA under the ear protector.

(4) Other methods may be utilized if they are at least as effective as the NRR if approved by the director.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-62-09053, filed 11/30/83; 82-03-023 (Order 82-1), § 296-62-09053, filed 1/15/82.]

WAC 296-62-09055 Appendix E—Noise exposure computation. (1) Computation of employee noise exposure.

(a) Noise dose is computed using Table E-1 as follows:

(i) When the sound level, L, is constant over the entire work shift, the noise dose, D, in percent, is given by: $D=100 C/T$ where C is the total length of the work day, in hours, and T is the reference duration corresponding to the measured sound level, L, as given in Table E-1 or by the formula shown as a footnote to that table.

(ii) When the workshift noise exposure is composed of two or more periods of noise at different levels, the total noise dose over the work day is given by: $D=100(C_1/T_1 + C_2/T_2 + \dots + C_n/T_n)$, where C_n indicates the total time of exposure at a specific noise level, and T_n indicates the reference duration for that level as given by Table E-1.

(b) The 8-hour time-weighted average sound level (TWA), in decibels, may be computed from the dose, in percent, by means of the formula: $TWA = 16.61 \log_{10}(D/100)+90$. For an 8-hour workshift with the noise level constant over the entire shift, the TWA is equal to the measured sound level.

(c) A table relating dose and TWA is given in subsection (2) of this section.

TABLE E-1

A-weighted sound level, L (decibel)	Reference duration, T (hour)
80	32
81	27.9
82	24.3
83	21.1
84	18.4
85	16
86	13.9
87	12.1
88	10.6
89	9.2
90	8
91	7.0
92	6.2
93	5.3
94	4.6
95	4

96	3.5
97	3.0
98	2.6
99	2.3
100	2
101	1.7
102	1.5
103	1.4
104	1.3
105	1
106	0.87
107	0.76
108	0.66
109	0.57
110	0.5
111	0.44
112	0.38
113	0.33
114	0.29
115	0.25
116	0.22
117	0.19
118	0.16
119	0.14
120	0.125
121	0.11
122	0.095
123	0.082
124	0.072
125	0.063
126	0.054
127	0.047
128	0.041
129	0.036
130	0.031

In the above table the reference duration T, is computed by

$$T = \frac{8}{2(L-90)/5}$$

where L is the measured A-weighted sound level.

(2) Conversion between "dose" and "8-hour time-weighted average" sound level.

(a) Compliance with WAC 296-62-09015 through 296-62-09055 of this regulation is determined by the amount of exposure to noise in the workplace. The amount of such exposure is usually measured with an audiodosimeter which gives a readout in terms of "dose." In order to better understand the requirements of these standards, dosimeter readings can be converted to an "8-hour time-weighted average (TWA) sound level."

(b) In order to convert the reading of a dosimeter into TWA, see Table E-2. This table applies to dosimeters that are set by the manufacturer to calculate dose or percent exposure according to the relationships in Table E-1. So, for example, a dose of 91 percent over an eight-hour day results in a TWA of 89.3 dB, and a dose of 50 percent corresponds to a TWA of 85 dB.

(c) If the dose as read on the dosimeter is less than or greater than the values found in Table E-2, the TWA may be calculated by using the formula: $TWA = 16.61 \log_{10} (D/100) + 90$ where TWA = 8-hour time-weighted average sound level and D = accumulated dose in percent exposure.

Table E-2 - Conversion from "percent noise exposure" or "dose" to "8-hour time-weighted average sound level" (TWA)

Dose or percent noise exposure	TWA (dBA)
10	73.4
15	76.3
20	78.4
25	80.0
30	81.3
35	82.4
40	83.2
45	84.2
50	85.0
55	85.7
60	86.3
65	86.9
70	87.4
75	87.9
80	88.4
81	88.5
82	88.6
83	88.7
84	88.7
85	88.8
86	88.9
87	89.0
88	89.1
89	89.2
90	89.2
91	89.3
92	89.4
93	89.5
94	89.6
95	89.6
96	89.7
97	89.8
98	89.9
99	89.9
100	90.0
101	90.1
102	90.1
103	90.2
104	90.3
105	90.4
106	90.4
107	90.5
108	90.6
109	90.6
110	90.7
111	90.8
112	90.8
113	90.9
114	90.9
115	91.1
116	91.1
117	91.1
118	91.2
119	91.3
120	91.3
125	91.6
130	91.9
135	92.2
140	92.4
145	92.7
150	92.9
155	93.2
160	93.4
165	93.6
170	93.8
175	94.0
180	94.2
185	94.4
190	94.6
195	94.8
200	95.0
210	95.4
220	95.7
230	96.0
240	96.3
250	96.6
260	96.9
270	97.2
280	97.4
290	97.7
300	97.9
310	98.2
320	98.4
330	98.6
340	98.8
350	99.0
360	99.2
370	99.4
380	99.6
390	99.8
400	100.0
410	100.2
420	100.4
430	100.5
440	100.7
450	100.8
460	101.0
470	101.2
480	101.3
490	101.5
500	101.6
510	101.8
520	101.9
530	102.0
540	102.2
550	102.3
560	102.4
570	102.6
580	102.7
590	102.8

600 102.9
 610 103.0
 620 103.2
 630 103.3
 640 103.4
 650 103.5
 660 103.6
 670 103.7
 680 103.8
 690 103.9
 700 104.0
 710 104.1
 720 104.2
 730 104.3
 740 104.4
 750 104.5
 760 104.6
 770 104.7
 780 104.8
 790 104.9
 800 105.0
 810 105.1
 820 105.2
 830 105.3
 840 105.4
 850 105.4
 860 105.5
 870 105.6
 880 105.7
 890 105.8
 900 105.8
 910 105.9
 920 106.0
 930 106.1
 940 106.2
 950 106.2
 960 106.3
 970 106.4
 980 106.5
 990 106.5
 999 106.6

use approved equipment (for specific requirements see applicable provisions of chapter 296-62 WAC) capable of providing safe respirable air, or prior to entry and at all times when workers are in such areas a sufficient supply of safe, respirable air shall be provided. All workers so exposed shall be under constant observation. If the oxygen content is unknown or may change during occupation, tests shall be required prior to and during occupation of questionable areas.

[Statutory Authority: Chapter 49.17 RCW. 91-24-017 (Order 91-07), § 296-62-100, filed 11/22/91, effective 12/24/91. RCW 49.17.040, 49.17.050, and 49.17.240. 81-16-015 (Order 81-20), § 296-62-100, filed 7/27/81; Order 73-3, § 296-62-100, filed 5/7/73; Order 70-8, § 296-62-100, filed 7/31/70, effective 9/1/70; Rule 10.010, effective 8/1/63.]

WAC 296-62-110 Ventilation.

[Order 73-3, § 296-62-110, filed 5/7/73; Order 70-8, § 296-62-110, filed 7/31/70, effective 9/1/70; Rules 11.010-11.030, effective 8/1/63.]

WAC 296-62-11001 Definition. Ventilation shall mean the provision, circulation or exhausting of air into or from an area or space.

(1) "Local exhaust ventilation" shall mean the mechanical removal of contaminated air from the point where the contaminant is being generated or liberated.

(2) "Dilution ventilation" means inducing and mixing uncontaminated air with contaminated air in such quantities that the resultant mixture in the breathing zone will not exceed the permissible exposure limit (PEL) specified for any contaminant.

(3) "Exhaust ventilation" means the general movement of air out of the area or permit-required confined space by mechanical or natural means.

(4) "Tempered makeup air" means air which has been conditioned by changing its heat content to obtain a specific desired temperature.

[Statutory Authority: Chapter 49.17 RCW. 95-04-007, § 296-62-11001, filed 1/18/95, effective 3/1/95. Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 42.30 and 43.22 RCW. 80-17-014 (Order 80-20), § 296-62-11001, filed 11/13/80; Order 73-3, § 296-62-11001, filed 5/7/73.]

WAC 296-62-11003 Ventilation guide. In addition to those mandatory controls as set forth in WAC 296-62-11015 through 296-62-11021, the Industrial Ventilation Manual of Recommended Practices as compiled and approved by the American Conference of Governmental Industrial Hygienists, applicable ANSI Standard or other National Consensus Standards recommended by the federal government, should be used as a guide for ventilation requirements.

[Order 73-3, § 296-62-11003, filed 5/7/73.]

WAC 296-62-11005 Adequate system. Adequate ventilation systems shall be installed as needed to control concentrations of airborne contaminants below applicable threshold limit values.

[Order 73-3, § 296-62-11005, filed 5/7/73.]

[Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-62-09055, filed 11/30/83.]

PART L—ATMOSPHERES, VENTILATION, EMERGENCY WASHING

WAC 296-62-100 Oxygen deficient atmospheres.

(1) Definition. A lack of sufficient oxygen is deemed to exist if the atmosphere at sea level has less than 19.5% oxygen by volume or has a partial pressure of oxygen of 148 millimeters of mercury (mm. Hg) or less. This may deviate when working at higher elevations and should be determined for an individual location. Factors such as acclimatization, physical conditions of the persons involved, etc., must be considered for such circumstances and conditions.

(2) Entering areas with possible oxygen deficient atmospheres. Workers entering any area where a lack of sufficient oxygen is probable shall be supplied with and shall

WAC 296-62-11007 Exhaust. Exhaust from ventilation systems shall discharge in such a manner that the contaminated air being exhausted will not present a health hazard to any workman or reenter buildings in harmful amounts.

[Order 73-3, § 296-62-11007, filed 5/7/73.]

WAC 296-62-11009 Make-up air quantity. Make-up air shall be of ample quantity to replace the exhausted air and shall be tempered when necessary.

[Order 73-3, § 296-62-11009, filed 5/7/73.]

WAC 296-62-11011 Design and operation. Ventilation systems shall be designed and operated in such a manner that employees will not be subjected to excessive air velocities.

[Statutory Authority: Chapter 49.17 RCW. 91-11-070 (Order 91-01), § 296-62-11011, filed 5/20/91, effective 6/20/91; Order 73-3, § 296-62-11011, filed 5/7/73.]

WAC 296-62-11013 Compatibility of systems. Make-up air systems shall be designed and operated in such a manner that they will not interfere with the effectiveness of the exhaust air system.

[Order 73-3, § 296-62-11013, filed 5/7/73.]

WAC 296-62-11015 Abrasive blasting. (1) Definitions.

(a) "Abrasive" means a solid substance used in an abrasive blasting operation.

(b) "Abrasive-blasting respirator" means a continuous flow air-line respirator constructed so that it will cover the wearer's head, neck, and shoulders to protect him from rebounding abrasive.

(c) "Blast cleaning barrel" means a complete enclosure which rotates on an axis, or which has an internal moving tread to tumble the parts, in order to expose various surfaces of the parts to the action of an automatic blast spray.

(d) "Blast cleaning room" means a complete enclosure in which blasting operations are performed and where the operator works inside of the room to operate the blasting nozzle and direct the flow of the abrasive material.

(e) "Blasting cabinet" means an enclosure where the operator stands outside and operates the blasting nozzle through an opening or openings in the enclosure.

(f) "Clean air" means air of such purity that it will not cause harm or discomfort to an individual if it is inhaled for extended periods of time.

(g) "Dust collector" means a device or combination of devices for separating dust from the air handled by an exhaust ventilation system.

(h) "Exhaust ventilation system" means a system for removing contaminated air from a space, comprising two or more of the following elements (i) enclosure or hood, (ii) duct work, (iii) dust collecting equipment, (iv) exhauster, and (v) discharge stack.

(i) "Particulate-filter respirator" means an air purifying respirator, commonly referred to as a dust or a fume respira-

tor, which removes most of the dust or fume from the air passing through the device.

(j) "Respirable dust" means airborne dust in sizes capable of passing through the upper respiratory system to reach the lower lung passages.

(k) "Rotary blast cleaning table" means an enclosure where the pieces to be cleaned are positioned on a rotating table and are passed automatically through a series of blast sprays.

(l) "Abrasive blasting" means the forcible application of an abrasive to a surface by pneumatic pressure, hydraulic pressure, or centrifugal force.

(2) Dust hazards from abrasive blasting.

(a) Abrasives and the surface coatings on the materials blasted are shattered and pulverized during blasting operations and the dust formed will contain particles of respirable size. The composition and toxicity of the dust from these sources shall be considered in making an evaluation of the potential health hazards.

(b) The concentration of respirable dust or fume in the breathing zone of the abrasive-blasting operator or any other worker shall be kept below the levels specified in WAC 296-62-075 through 296-62-07515.

(c) Organic abrasives which are combustible shall be used only in automatic systems. Where flammable or explosive dust mixtures may be present, the construction of the equipment, including the exhaust system and all electric wiring shall conform to the requirements of American National Standard Installation of Blower and Exhaust Systems for Dust, Stock, and Vapor Removal or Conveying, Z33.1-1961 (NFPA 91-1961), and chapter 296-24 WAC Part L. The blast nozzle shall be bonded and grounded to prevent the build-up of static charges. Where flammable or explosive dust mixtures may be present, the abrasive blasting enclosure, the ducts, and the dust collector shall be constructed with loose panels or explosion venting areas, located on sides away from any occupied area, to provide for pressure relief in case of explosion, following the principles set forth in the National Fire Protection Association Explosion Venting Guide, NFPA 68-1954.

(3) Blast-cleaning enclosures.

(a) Blast-cleaning enclosures shall be exhaust ventilated in such a way that a continuous inward flow of air will be maintained at all openings in the enclosure, during the blasting operation.

(i) All air inlets and access openings shall be baffled or so arranged that by the combination of inward air flow and baffling the escape of abrasive or dust particles into an adjacent work area will be minimized and visible spurts of dust will not be observed.

(ii) The rate of exhaust shall be sufficient to provide prompt clearance of the dust-laden air within the enclosure after the cessation of blasting.

(iii) Before the enclosure is opened, the blast shall be turned off and the exhaust system shall be run for a sufficient period of time to remove the dusty air within the enclosure.

(iv) Safety glass protected by screening shall be used in observation windows, where hard deep-cutting abrasives are used.

(v) Slit abrasive-resistant baffles shall be installed in multiple sets at all small access openings where dust might escape, and shall be inspected regularly and replaced when needed.

(A) Doors shall be flanged and tight when closed.

(B) Doors on blast-cleaning rooms shall be operable from both inside and outside, except that where there is a small operator access door, the large work access door may be closed or opened from the outside only.

(4) Exhaust ventilation systems.

(a) The construction, installation, inspection, and maintenance of exhaust systems shall conform to the principles and requirements set forth in American National Standard Fundamentals Governing the Design and Operation of Local Exhaust Systems, Z9.2-1960, and ANSI Z33.1-1961.

(i) When dust leaks are noted, repairs shall be made as soon as possible.

(ii) The static pressure drop at the exhaust ducts leading from the equipment shall be checked when the installation is completed and periodically thereafter to assure continued satisfactory operation. Whenever an appreciable change in the pressure drop indicates a partial blockage, the system shall be cleaned and returned to normal operating condition.

(b) In installations where the abrasive is recirculated, the exhaust ventilation system for the blasting enclosure shall not be relied upon for the removal of fines from the spent abrasive instead of an abrasive separator. An abrasive separator shall be provided for the purpose.

(c) The air exhausted from blast-cleaning equipment shall be discharged through dust collecting equipment. Dust collectors shall be set up so that the accumulated dust can be emptied and removed without contaminating other working areas.

(5) Personal protective equipment. See applicable provisions of chapters 296-24 and 296-62 WAC.

(a) Abrasive-blasting respirators shall be worn by all abrasive-blasting operators:

(i) When working inside of blast-cleaning rooms, or

(ii) When using silica sand in manual blasting operations where the nozzle and blast are not physically separated from the operator in an exhaust ventilated enclosure, or

(iii) Where concentrations of toxic dust dispersed by the abrasive-blasting may exceed the limits set in WAC 296-62-075 through 296-62-07515 and the nozzle and blast are not physically separated from the operator in an exhaust-ventilated enclosure.

(b) Particulate filter respirators, commonly referred to as dust-filter respirators, properly fitted, may be used for short, intermittent, or occasional dust exposures such as cleanup, dumping of dust collectors, or unloading shipments of sand at a receiving point, when it is not feasible to control the dust by enclosure, exhaust ventilation, or other means. Respirators used shall be approved for protection against the specific type of dust encountered.

(i) Dust-filter respirators may be used to protect the operator of outside abrasive-blasting operations where nonsilica abrasives are used on materials having low toxicities.

(ii) Dust-filter respirators shall not be used for continuous protection where silica sand is used as the blasting abrasive, or toxic materials are blasted.

(c) A respiratory protection program as defined and described in applicable provisions of chapters 296-24 and 296-62 WAC, shall be established wherever it is necessary to use respiratory protective equipment.

(d) Refer to applicable provisions of chapter 296-24 WAC for operators personal protective equipment.

(6) Operational procedures and general safety. Dust shall not be permitted to accumulate on the floor or on ledges outside of an abrasive-blasting enclosure, and dust spills shall be cleaned up promptly. Aisles and walkways shall be kept clear of steel shot or similar abrasive which may create a slipping hazard.

(7) Scope. This paragraph applies to all operations where an abrasive is forcibly applied to a surface by pneumatic or hydraulic pressure, or by centrifugal force. It does not apply to steam blasting, or steam cleaning, or hydraulic cleaning methods where work is done without the aid of abrasives.

[Statutory Authority: Chapter 49.17 RCW. 91-24-017 (Order 91-07), § 296-62-11015, filed 11/22/91, effective 12/24/91. RCW 49.17.040, 49.17.050, and 49.17.240. 81-16-015 (Order 81-20), § 296-62-11015, filed 7/27/81; 80-11-010 (Order 80-14), § 296-62-11015, filed 8/8/80; Order 73-3, § 296-62-11015, filed 5/7/73.]

WAC 296-62-11017 Grinding, polishing, and buffing operations. (1) Definitions.

(a) "Abrasive cutting-off wheels" means organic-bonded wheels, the thickness of which is not more than one forty-eighth of their diameter for those up to, and including, 20 inches in diameter, and not more than one-sixteenth of their diameter for those larger than 20 inches in diameter, used for a multitude of operations variously known as cutting, cutting off, grooving, slotting, coping, jointing, and the like. The wheels may be "solid" consisting of organic-bonded abrasive material throughout, "steel centered" consisting of a steel disc with a rim of organic-bonded material moulded around the periphery or of the "inserted tooth" type consisting of a steel disc with organic-bonded abrasive teeth or inserts mechanically secured around the periphery.

(b) "Belts" means all power-driven, flexible, coated bands used for grinding, polishing, or buffing purposes.

(c) "Branch pipe" means the part of an exhaust system piping that is connected directly to the hood or enclosure.

(d) "Cradle" means a movable fixture, upon which the part to be ground or polished is placed.

(e) "Disc wheels" means all power-driven rotatable discs faces with abrasive materials, artificial or natural, and used for grinding or polishing on the side of the assembled disc.

(f) "Entry loss" means the loss in static pressure caused by air flowing into a duct or hood. It is usually expressed in inches of water gauge.

(g) "Exhaust system" means a system consisting of branch pipes connected to hoods of enclosures, one or more header pipes, an exhaust fan, means for separating solid contaminants from the air flowing in the system, and a discharge stack to outside.

(h) "Grinding wheels" means all power-driven rotatable grinding or abrasive wheels, except disc wheels as defined

in this standard, consisting of abrasive particles held together by artificial or natural bonds and used for peripheral grinding.

(i) "Header pipe (main pipe)" means a pipe into which one or more branch pipes enter and which connects such branch pipes to the remainder of the exhaust system.

(j) "Hoods and enclosures" means the partial or complete enclosure around the wheel or disc through which air enters an exhaust system during operation.

(k) "Horizontal double-spindle disc grinder" means a grinding machine carrying two power-driven, rotatable, coaxial, horizontal spindles upon the inside ends of which are mounted abrasive disc wheels for grinding two surfaces simultaneously.

(l) "Horizontal single-spindle disc grinder" means a grinding machine carrying an abrasive disc wheel upon one or both ends of a power-driven, rotatable single horizontal spindle.

(m) "Polishing and buffing wheels" means all power-driven rotatable wheels composed all or in part of textile fabrics, wood, felt, leather, paper, and may be coated with abrasives on the periphery of the wheel for purposes of polishing, buffing, and light grinding.

(n) "Portable grinder" means any power-driven rotatable grinding, polishing, or buffing wheel mounted in such manner that it may be manually manipulated.

(o) "Scratch brush wheels" means all power-driven rotatable wheels made from wire or bristles, and used for scratch cleaning and brushing purposes.

(p) "Swing-frame grinder" means any power-driven rotatable grinding, polishing, or buffing wheel mounted in such a manner that the wheel with its supporting framework can be manipulated over stationary objects.

(q) "Velocity pressure (vp)" means the kinetic pressure in the direction of flow necessary to cause a fluid at rest to flow at a given velocity. It is usually expressed in inches of water gauge.

(r) "Vertical spindle disc grinder" means a grinding machine having a vertical, rotatable power-driven spindle carrying a horizontal abrasive disc wheel.

(2) Application.

(a) Every establishment performing dry grinding, dry polishing, or buffing shall provide suitable hood or enclosures that are connected to exhaust systems.

(b) Such exhaust systems shall be operated continuously whenever such operations are carried on, and be capable of preventing contaminants from entering the breathing zone.

(3) Hood and branch pipe requirements.

(a) Hoods connected to exhaust systems shall be used, and such hoods shall be designed, located, and placed so that the dust or dirt particles shall fall or be projected into the hoods in the direction of the air flow. No wheels, discs, straps, or belts shall be operated in such manner and in such direction as to cause the dust and dirt particles to be thrown into the operator's breathing zone.

(b) Grinding wheels on floor stands, pedestals, benches, and special-purpose grinding machines and abrasive cutting-off wheels shall have not less than the minimum exhaust volumes shown in Table 8 with a recommended minimum duct velocity of 4,500 feet per minute in the branch and 3,500 feet per minute in the main. The entry losses from all

hoods except the vertical-spindle disc grinder hood, shall equal 0.65 velocity pressure for a straight takeoff and 0.45 velocity pressure for a tapered takeoff. The entry loss for the vertical-spindle disc grinder hood is shown in Figure 3. (See Fig. 3 following this section.)

TABLE 8
GRINDING AND ABRASIVE CUTTING-OFF WHEELS

Wheel diameter (inches)	Wheel width (inches)	Minimum exhaust volume (feet ³ /min.)
To 9	1 1/2	220
Over 9 to 16	2	390
Over 16 to 19	3	500
Over 19 to 24	4	610
Over 24 to 30	5	880
Over 30 to 36	6	1,200

For any wheel wider than wheel diameter shown in Table 8, increase the exhaust volume by the ratio of the new width to the width shown.

Example:

If wheel width = 4 1/2 inches, then

4.5

— x 610 = 686 (rounded to 690).

4

(c) Scratch-brush wheels and all buffing and polishing wheels mounted on floor stands, pedestals, benches, or special-purpose machines shall have not less than the minimum exhaust volume shown in Table 9.

TABLE 9
BUFFING AND POLISHING WHEELS

Wheel diameter (inches)	Wheel width (inches)	Minimum exhaust volume (feet ³ /min.)
To 9	2	300
Over 9 to 16	3	500
Over 16 to 19	4	610
Over 19 to 24	5	740
Over 24 to 30	6	1,040
Over 30 to 36	6	1,200

(d) Grinding wheels or discs for horizontal single-spindle disc grinders shall be hooded to collect the dust or dirt generated by the grinding operation and the hoods shall be connected to branch pipes having exhaust volumes as shown in Table 10.

TABLE 10
HORIZONTAL SINGLE-SPINDLE DISC GRINDER

Disc diameter (inches)	Exhaust volume (feet ³ /min.)
Up to 12	220
Over 12 to 19	390
Over 19 to 30	610
Over 30 to 36	880

(e) Grinding wheels or discs for horizontal double-spindle disc grinders shall have a hood enclosing the grinding chamber and the hood shall be connected to one or more branch pipes having exhaust volumes as shown in Table 11.

TABLE 11
HORIZONTAL DOUBLE-SPINDLE
DISC GRINDER

Disc diameter (inches)	Exhaust volume (feet ³ /min.)
Up to 19	610
Over 19 to 25	880
Over 25 to 30	1,200
Over 30 to 53	1,770
Over 53 to 72	6,280

(f) Grinding wheels or discs for vertical single-spindle disc grinders shall be encircled with hoods to remove the dust generated in the operation. The hoods shall be connected to one or more branch pipes having exhaust volumes as shown in Table 12.

TABLE 12
VERTICAL SPINDLE DISC GRINDER

Disc diameter (inches)	One-half or more of disc covered		Disc not covered	
	Number ¹	Exhaust feet ³ /min.	Number ¹	Exhaust feet ³ /min.
Up to 20	1	500	2	780
Over 20 to 30	2	780	2	1,480
Over 30 to 53	2	1,770	4	3,530
Over 53 to 72	2	3,140	5	6,010

¹ Number of exhaust outlets around periphery of hood, or equal distribution provided by other means.

(g) Grinding and polishing belts shall be provided with hoods to remove dust and dirt generated in the operations and the hoods shall be connected to branch pipes having exhaust volumes as shown in Table 13.

TABLE 13
GRINDING AND POLISHING BELTS

Belts width (inches)	Exhaust volume (feet ³ /min.)
Up to 3	220
Over 3 to 5	300
Over 5 to 7	390
Over 7 to 9	500
Over 9 to 11	610
Over 11 to 13	740

(h) Cradles and swing-frame grinders. Where cradles are used for handling the parts to be ground, polished, or buffed, requiring large partial enclosures to house the complete operation, a minimum average air velocity of 150 feet per minute shall be maintained over the entire opening of the enclosure. Swing-frame grinders shall also be exhausted in the same manner as provided for cradles. (See Fig. 5 following this section.)

(i) Where the work is outside the hood, air volumes must be increased as shown in American Standard Fundamentals Governing the Design and Operation of Local Exhaust Systems, Z9.2-1960 (Section 4, Exhaust Hoods).

(4) Exhaust systems.

(a) Exhaust systems for grinding, polishing, and buffing operations should be designed in accordance with American Standard Fundamentals Governing the Design and Operation of Local Exhaust Systems, Z9.2-1960.

(b) Exhaust systems for grinding, polishing, and buffing operations shall be tested in the manner described in American Standard Fundamentals Governing the Design and Operation of Local Exhaust Systems, Z9.2-1960.

(c) All exhaust systems shall be provided with suitable dust collectors.

(5) Hood and enclosure design.

(a)(i) It is the dual function of grinding and abrasive cutting-off wheel hoods to protect the operator from the hazards of bursting wheels as well as to provide a means for the removal of dust and dirt generated. All hoods shall be not less in structural strength than specified in the American National Standard Code for the Use, Care, and Protection of Abrasive Wheels, B7.1-1970.

(ii) For grinding machines for which no standard hoods are available, hoods meeting the requirements of (5)(a)(i) above shall be developed and so located so as to comply with the requirements of this section.

(b) Exhaust hoods for floor stands, pedestals, and bench grinders shall be designed in accordance with Figure 4. (See Fig. 4 following this section.) The adjustable tongue shown in the figure shall be kept in working order and shall be adjusted within one-fourth inch of the wheel periphery at all times.

(c) Swing-frame grinders shall be provided with exhaust booths as indicated in Figure 5. (See Fig. 5 following this section.)

(d) Portable grinding operations, whenever the nature of the work permits, shall be conducted within a partial enclosure. The opening in the enclosure shall be no larger than is actually required in the operation and an average face air velocity of not less than 200 feet per minute shall be maintained.

(e) Hoods for polishing and buffing and scratch-brush wheels shall be constructed to conform as closely to Figure 6 as the nature of the work will permit. (See Fig. 6 following this section.)

(f) Cradle grinding and polishing operations shall be performed within a partial enclosure similar to Figure 7. (See Fig. 7 following this section.) The operator shall be positioned outside the working face of the opening of the enclosure. The face opening of the enclosure should not be any greater in area than that actually required for the performance of the operation and the average air velocity into the working face of the enclosure shall not be less than 150 feet per minute.

(g) Hoods for horizontal single-spindle disc grinders shall be constructed to conform as closely as possible to the hood shown in Figure 8. (See Fig. 8 following this section.) It is essential that there be a space between the back of the wheel and the hood, and a space around the periphery of the wheel of at least 1 inch in order to permit the suction to act

around the wheel periphery. The opening on the side of the disc shall be no larger than is required for the grinding operation, but must never be less than twice the area of the branch outlet.

(h) Horizontal double-spindle disc grinders shall have a hood encircling the wheels and grinding chamber similar to that illustrated in Figure 9. (See Fig. 9 following this section.) The openings for passing the work into the grinding chamber should be kept as small as possible, but must never be less than twice the area of the branch outlets.

(i) Vertical-spindle disc grinders shall be encircled with a hood so constructed that the heavy dust is drawn off a

surface of the disc and the lighter dust exhausted through a continuous slot at the top of the hood as shown in Figure 3. (See Fig. 3 following this section.)

(j) Grinding and polishing belt hoods shall be constructed as close to the operation as possible. The hood should extend almost to the belts, and 1-inch wide openings should be provided on either side. Figure 10 shows a typical hood for a belt operation. (See Fig. 10 following this section.)

(6) Scope. This paragraph, prescribes the use of exhaust hood enclosures and systems in removing dust, dirt, fumes, and gases generated through the grinding, polishing, or buffing of ferrous and nonferrous metals.

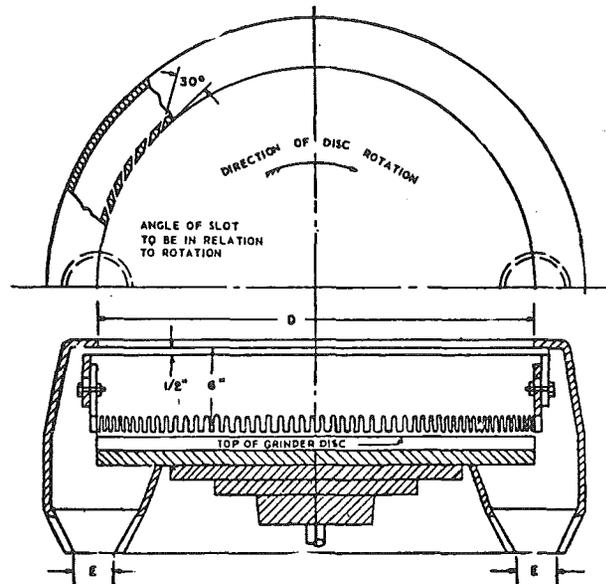


Fig. 3

Vertical Spindle Disc Grinder Exhaust Hood and Branch Pipe Connections

Dia D. Inches		Exhaust E		Volume Exhausted at 4,500 ft/min ft ³ /min	Note
Min.	Max	No. Pipes	Dia		
	20	1	4 1/2	500	When one-half or more of the disc can be hooded, use exhaust ducts as shown at the left.
Over 20	30	2	4	780	
Over 30	72	2	6	1,770	
Over 53	72	2	8	3,140	
	20	2	4	780	When no hood can be used over disc, use exhaust ducts as shown at left.
Over 20	30	2	5 1/2	1,480	
Over 30	53	4	6	3,530	
Over 53	72	5	7	6,010	

Entry loss = 1.0 slot velocity pressure + 0.5 branch velocity pressure
 Minimum slot velocity = 2,000 ft/min - 1/2-inch slot width

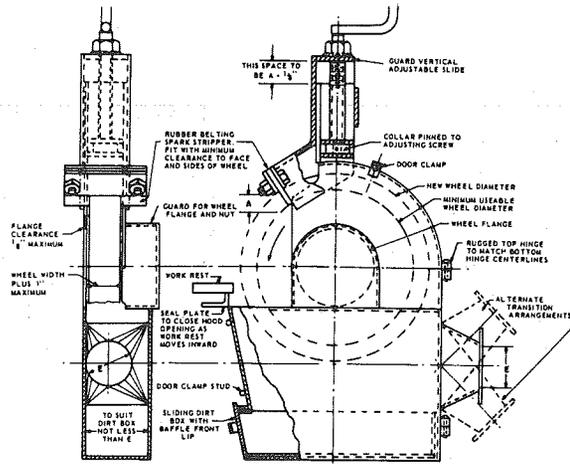


Fig. 4
Standard Grinder Hood

Wheel Dimension		Exhaust Outlet Inches	Volume of Air at 4,500 ft/min
Diameter, Inches			
Min = d	Max = D	E	
	9	3	220
Over 9	16	4	390
Over 16	19	4 1/2	500
Over 19	24	5	610
Over 24	30	6	880
Over 30	36	7	1,200

Entry loss = 0.45 velocity pressure for tapered takeoff
0.65 velocity pressure for straight takeoff

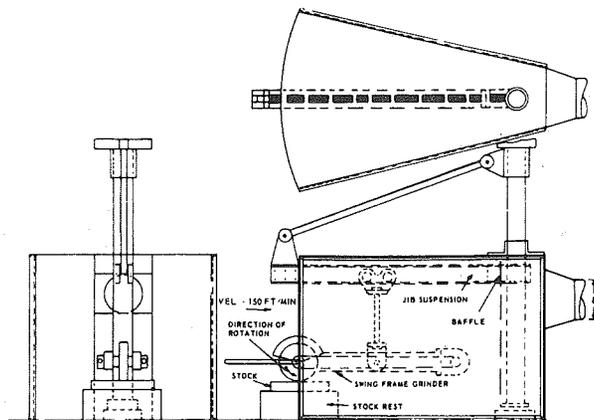


Fig. 5
A method of Applying an Exhaust Enclosure to Swing-Frame Grinders
Note: Baffle to reduce front opening as much as possible

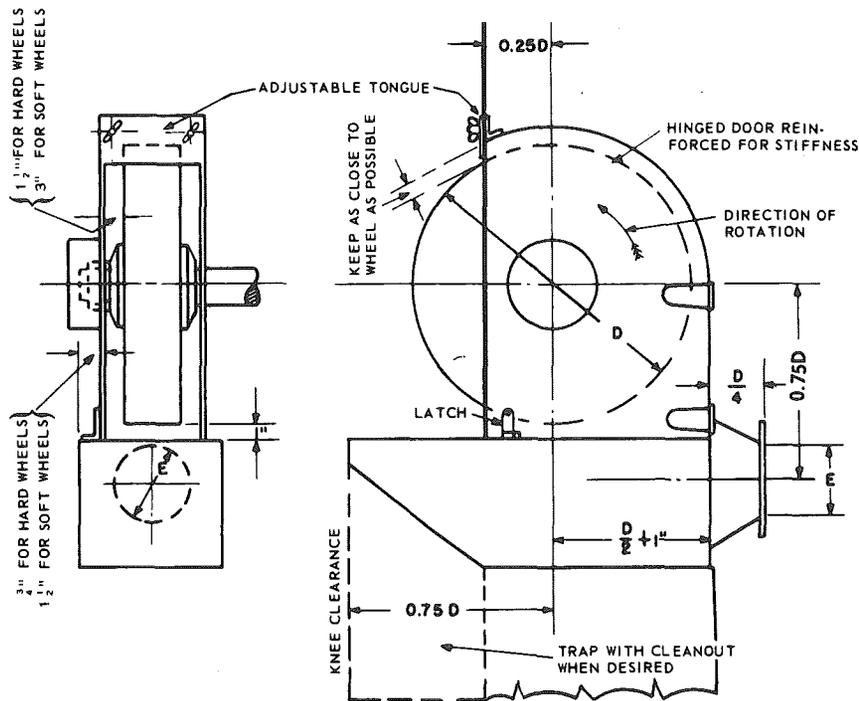


Fig. 6
Standard Buffing and Polishing Hood

Wheel Dimension, Inches			Exhaust Outlet Inches	Volume of Air at 4,500 ft/min
Diameter		Width		
Min = d	Max = D	Max	E	
	9	2	3 1/2	300
Over 9	16	3	4	500
Over 16	19	4	5	610
Over 19	24	5	5 1/2	740
Over 24	30	6	6 1/2	1,040
Over 30	36	6	7	1,200

Entry loss = 0.45 velocity pressure for tapered takeoff
 0.65 velocity pressure for straight takeoff

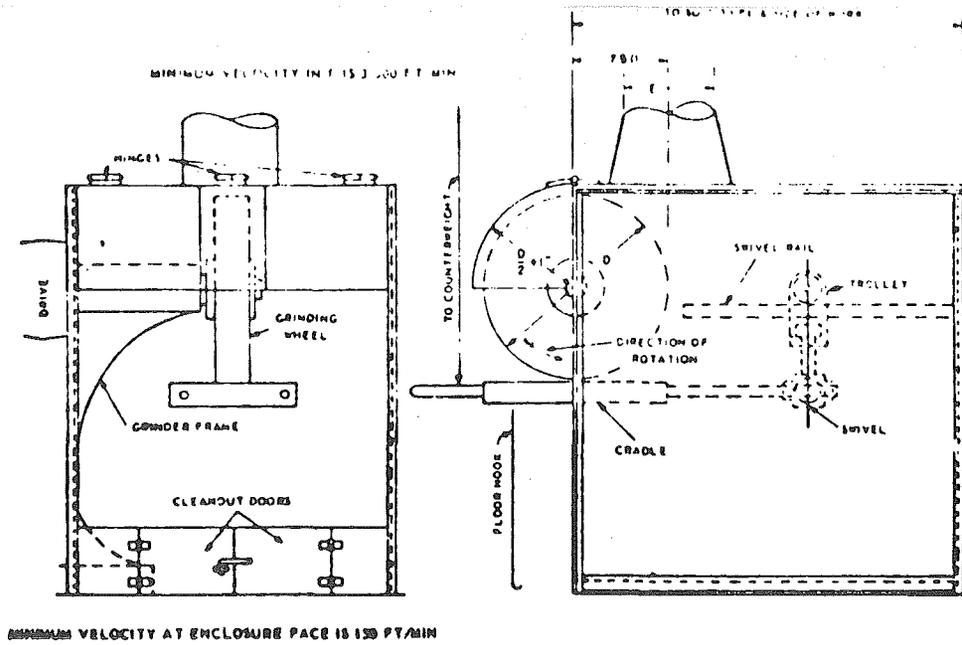


Fig. 7

Cradle Polishing or Grinding Enclosure

Entry loss = 0.45 velocity pressure for tapered takeoff

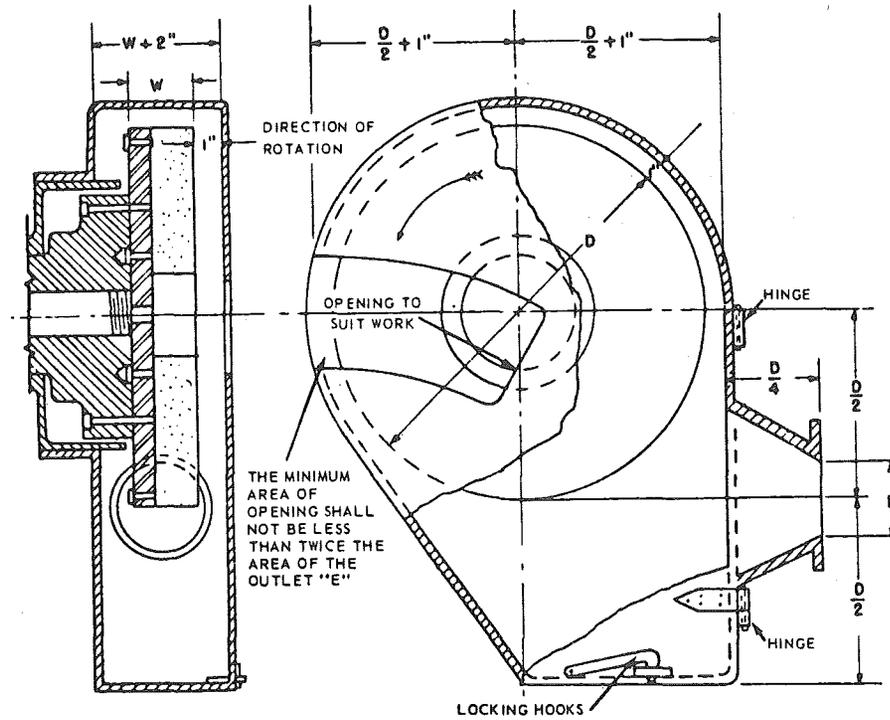


Fig. 8
Horizontal Single-Spindle Disc Grinder
Exhaust Hood and Branch Pipe Connection

Dia. D. Inches		Exhaust E	Volume Exhausted at 4,500 ft/min ft ³ /min
Min	Max	Dia. Inches	
	12	3	220
Over 12	19	4	390
Over 19	30	5	610
Over 30	36	6	880

Note: If grinding wheels are used for disc grinding purposes, hoods must conform to structural strength and materials as described in 9.1.
Entry loss = 0.45 velocity pressure for tapered takeoff

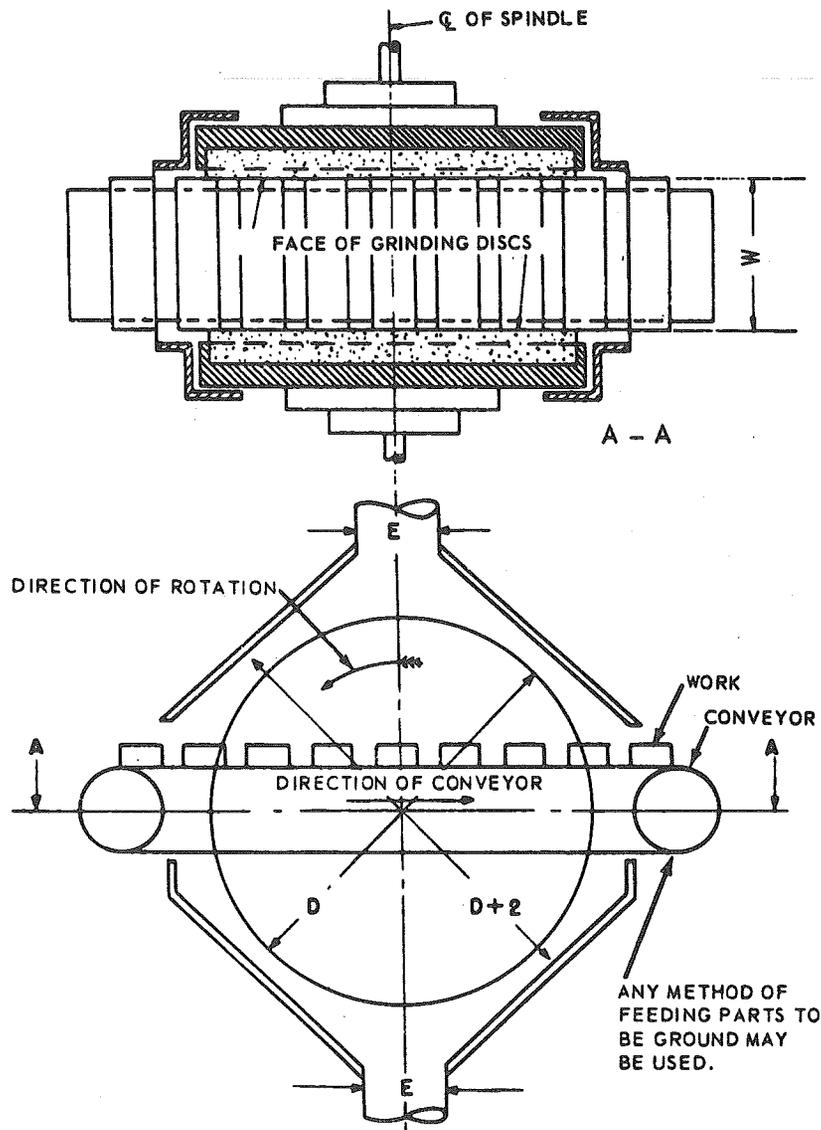


Fig. 9

Horizontal Double-Spindle Disc Grinder
Exhaust Hood and Branch Pipe Connection

Disc Dia. Inches		Exhaust E		Volume Exhausted at 4,500 ft/min ft ³ /min	Note
Min.	Max	No. Pipes	Dia		
	19	1	5	610	When width "W" permits, exhaust ducts should be as near heaviest grinding as possible.
Over 19	25	1	6	880	
Over 25	30	1	7	1,200	
Over 30	53	2	6	1,770	
Over 53	72	4	8	6,280	

Entry loss = 0.45 velocity pressure for tapered takeoff

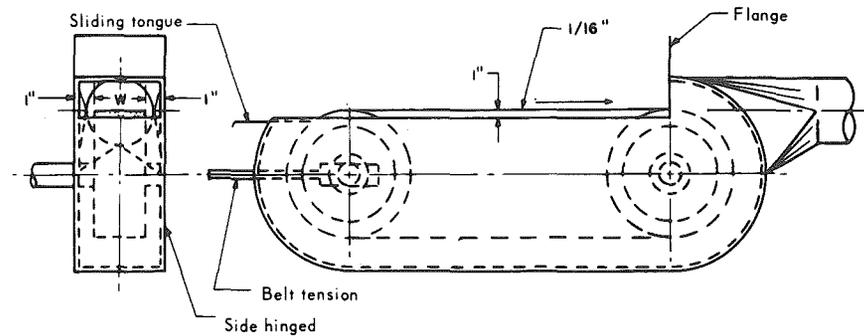


Fig. 10

A Typical Hood for a Belt Operation

Belt Width w. Inches	Exhaust Volume. ft ³ /min
up to 3	220
3 to 5	300
5 to 7	390
7 to 9	500
9 to 11	610
11 to 13	740

Minimum duct velocity = 4.500 ft./min. branch.
3.500 ft./min. main.

Entry loss = 0.45 velocity pressure for tapered takeoff
0.65 velocity pressure for straight takeoff

[Order 73-3, § 296-62-11017 and diagrams, filed 5/7/73.]

WAC 296-62-11019 Spray-finishing operations. (1) Definitions.

(a) "Spray-finishing operations" means employment of methods wherein organic or inorganic materials are utilized in dispersed form from deposit on surfaces to be coated, treated or cleaned. Such methods of deposit may involve either automatic, manual, or electrostatic deposition but do not include metal spraying or metallizing, dipping, flow coating, roller coating, tumbling, centrifuging, or spray washing and degreasing as conducted in self-contained washing and degreasing machines or systems.

(b) "Spray booth" spray booths are defined and described in WAC 296-24-370 through 296-24-37007. (See sections 103, 104, and 105 of the Standard for Spray Finishing Using Flammable and Combustible Materials, NFPA No. 33-1969.)

(c) "Spray room" means a room in which spray-finishing operations not conducted in a spray booth are performed separately from other areas.

(d) "Minimum maintained velocity" means the velocity of air movement which must be maintained in order to meet minimum specified requirements for health and safety.

(2) Location and application. Spray booths or spray rooms are to be used to enclose or confine all operations.

Spray-finishing operations shall be located as provided in sections 201 through 206 of the Standard for Spray Finishing Using Flammable and Combustible Materials, NFPA No. 33-1969.

(3) Design and construction of spray booths.

(a) Spray booths shall be designed and constructed in accordance with WAC 296-24-370 through 296-24-37007 (see sections 301-304 and 306-310 of the Standard for Spray Finishing Using Flammable and Combustible Materials, NFPA No. 33-1969), for general construction specifications.

Note: For a more detailed discussion of fundamentals relating to this subject, see ANSI Z9.2-1960.

(i) Lights, motors, electrical equipment and other sources of ignition shall conform to the requirements of WAC 296-24-370. (See section 310 and chapter 4 of the Standard for Spray Finishing Using Flammable and Combustible Materials, NFPA No. 33-1969.)

(ii) In no case shall combustible material be used in the construction of a spray booth and supply or exhaust duct connected to it.

(b) Unobstructed walkways shall not be less than 6 1/2 feet high and shall be maintained clear of obstruction from any work location in the booth to a booth exit or open booth front. In booths where the open front is the only exit, such exits shall be not less than 3 feet wide. In booths having multiple exits, such exits shall not be less than 2 feet wide, provided that the maximum distance from the work location to the exit is 25 feet or less. Where booth exits are provided with doors, such doors shall open outward from the booth.

(c) Baffles, distribution plates, and dry-type overspray collectors shall conform to the requirements of WAC 296-24-370. (See sections 304 and 305 of the Standard for Spray Finishing Using Flammable and Combustible Materials, NFPA No. 33-1969.)

(i) Overspray filters shall be installed and maintained in accordance with the requirements of WAC 296-24-370, (See section 305 of the Standard for Spray Finishing Using Flammable and Combustible Materials, NFPA No. 33-1969), and shall only be in a location easily accessible for inspection, cleaning, or replacement.

(ii) Where effective means, independent of the overspray filters are installed which will result in design air distribution

across the booth cross section, it is permissible to operate the booth without the filters in place.

(d)(i) For wet or water-wash spray booths, the water-chamber enclosure, within which intimate contact of contaminated air and cleaning water or other cleaning medium is maintained, if made of steel, shall be 18 gauge or heavier and adequately protected against corrosion.

(ii) Chambers may include scrubber spray nozzles, headers, troughs, or other devices. Chambers shall be provided with adequate means for creating and maintaining scrubbing action for removal of particulate matter from the exhaust air stream.

(e) Collecting tanks shall be of welded steel construction or other suitable noncombustible material. If pits are used as collecting tanks, they shall be concrete, masonry, or other material having similar properties.

(i) Tanks shall be provided with weirs, skimmer plates, or screens to prevent sludge and floating paint from entering the pump suction box. Means for automatically maintaining the proper water level shall also be provided. Fresh water inlets shall not be submerged. They shall terminate at least one pipe diameter above the safety overflow level of the tank.

(ii) Tanks shall be so constructed as to discourage accumulation of hazardous deposits.

(f) Pump manifolds, risers, and headers shall be adequately sized to insure sufficient water flow to provide efficient operation of the water chamber.

(4) Design and construction of spray rooms.

(a) Spray rooms, including floors, shall be constructed of masonry, concrete, or other noncombustible material.

(b) Spray rooms shall have noncombustible fire doors and shutters.

(c) Spray rooms shall be adequately ventilated so that the atmosphere in the breathing zone of the operator shall be maintained in accordance with the requirements of (6)(b) of this section.

(d) Spray rooms used for production spray-finishing operations shall conform to the requirements of spray booths.

(5) Ventilation.

(a) Ventilation shall be provided in accordance with provisions of WAC 296-24-370, (See chapter 5 of the Standard for Spray Finishing Using Flammable or Combustible Materials, NFPA No. 33-1969), and in accordance with the following:

(i) Where a fan plenum is used to equalize or control the distribution of exhaust air movement through the booth, it shall be of sufficient strength or rigidity to withstand the differential air pressure or other superficially imposed loads for which the equipment is designed and also to facilitate cleaning. Construction specifications shall be at least equivalent to those of (5)(c) of this section.

(ii) All fan ratings shall be in accordance with Air Moving and Conditioning Association Standard Test Code for Testing Air Moving Devices, Bulletin 210, April 1962.

(b) Inlet or supply ductwork used to transport makeup air to spray booths or surrounding areas shall be constructed of noncombustible materials.

(i) If negative pressure exists within inlet ductwork, all seams and joints shall be sealed if there is a possibility of

infiltration of harmful quantities of noxious gases, fumes, or mists from areas through which ductwork passes.

(ii) Inlet ductwork shall be sized in accordance with volume flow requirements and provide design air requirements at the spray booth.

(iii) Inlet ductwork shall be so supported throughout its length to sustain at least its own weight plus any negative pressure which is exerted upon it under normal operating conditions.

(c) Ducts shall be so constructed as to provide structural strength and stability at least equivalent to sheet steel of not less than the following thickness:

DIAMETER OR GREATER DIMENSION	(U.S. gauge)
Up to 8 inches inclusive	No. 24
Over 8 inches to 18 inches inclusive	No. 22
Over 18 inches to 30 inches inclusive	No. 20
Over 30 inches	No. 18

(i) Exhaust ductwork shall be adequately supported throughout its length to sustain its weight plus any normal accumulation in interior during normal operating conditions and any negative pressure exerted upon it.

(ii) Exhaust ductwork shall be sized in accordance with good design practice which shall include consideration of fan capacity, length of duct, number of turns and elbows, variation in size, volume, and character of materials being exhausted. See American National Standard Z9.2-1960 for further details and explanation concerning elements of design.

(iii) Longitudinal joints in sheet steel ductwork shall be either lock-seamed, riveted, or welded. For other than steel construction, equivalent securing of joints shall be provided.

(iv) Circumferential joints in ductwork shall be substantially fastened together and lapped in the direction of airflow. At least every fourth joint shall be provided with connecting flanges, bolted together or of equivalent fastening security.

(v) Inspection or clean-out doors shall be provided for every 9 to 12 feet of running length for ducts up to 12 inches in diameter, but the distance between clean-out doors may be greater for larger pipes. (See 8.3.21 of American National Standard Z9.1-1960.) A clean-out door or doors shall be provided for servicing the fan, and where necessary, a drain shall be provided.

(vi) Where ductwork passes through a combustible roof or wall, the roof or wall shall be protected at the point of penetration by open space or fire-resistive material between the duct and the roof or wall. When ducts pass through fire-walls, they shall be provided with automatic fire dampers on both sides of the wall, except that three-eighth-inch steel plates may be used in lieu of automatic fire dampers for ducts not exceeding 18 inches in diameter.

(vii) Ductwork used for ventilating any process covered in this standard shall not be connected to ducts ventilating any other process or any chimney or flue used for conveying any products of combustion.

(6) Velocity and air flow requirements.

(a) Except where a spray booth has an adequate air replacement system, the velocity of air into all openings of

a spray booth shall be not less than that specified in Table 14 for the operating conditions specified. An adequate air replacement system is one which introduces replacement air upstream or above the object being sprayed and is so designed that the velocity of air in the booth cross section is not less than that specified in Table 14 when measured upstream or above the object being sprayed.

TABLE 14
MINIMUM MAINTAINED VELOCITIES
INTO SPRAY BOOTHS

Operating Airflow conditions for object completely inside booth	Crossdraft f.p.m.	Velocities, f.p.m.	
		Design	Range
Electrostatic and automatic airless operation contained in booth without operator.	Negligible	50 large booth	50-75
		100 small booth	75-125
Air-operated guns, manual or automatic	Up to 50	100 large booth	75-125
		150 small booth	125-175
Air-operated guns, manual or automatic	Up to 100	150 large booth	125-175
		200 small booth	150-250

Notes:

- (1) Attention is invited to the fact that the effectiveness of the spray booth is dependent upon the relationship of the depth of the booth to its height and width.
- (2) Crossdrafts can be eliminated through proper design and such design should be sought. Crossdrafts in excess of 100 fpm (feet per minute) should not be permitted.
- (3) Excessive air pressures result in loss of both efficiency and material waste in addition to creating a backlash that may carry overspray and fumes into adjacent work areas.
- (4) Booths should be designed with velocity shown in the column headed "Design." However, booths operating with velocities shown in the column headed "Range" are in compliance with this standard.

(b) In addition to the requirements in (6)(a) of this section the total air volume exhausted through a spray booth shall be such as to dilute solvent vapor to at least 25 percent of the lower explosive limit of the solvent being sprayed. An example of the method of calculating this volume is given below.

Example: To determine the lower explosive limits of the most common solvents used in spray finishing, see Table 15. Column 1 gives the number of cubic feet of vapor per gallon of solvent and column 2 gives the lower explosive limit (LEL) in percentage by volume of air. Note that the quantity of solvent will be diminished by the quantity of solids and nonflammable contained in the finish.

To determine the volume of air in cubic feet necessary to dilute the vapor from 1 gallon of solvent to 25 percent of the lower explosive limit, apply the following formula:

$$\text{Dilution volume required per = gallon of solvent} = \frac{4 (100\text{-LEL}) (\text{cubic feet of vapor per gallon})}{\text{LEL}}$$

Using toluene as the solvent.

- (1) LEL of toluene from Table 15, column 2, is 1.4 percent.

(2) Cubic feet of vapor per gallon from Table 15, column 1, is 30.4 cubic feet per gallon.

(3) Dilution volume required =

$$\frac{4 (100\text{-}1.4) 30.4}{1.4} = 8,564 \text{ cubic feet.}$$

(4) To convert to cubic feet per minute of required ventilation, multiply the dilution volume required per gallon of solvent by the number of gallons of solvent evaporated per minute.

TABLE 15
LOWER EXPLOSIVE LIMIT OF SOME
COMMONLY USED SOLVENTS

Solvent	Lower explosive limit in percent by volume of air at 70°F.	
	Column 1	Column 2
Acetone	44.0	2.6
Amyl Acetate (iso)	21.6	1.0 ¹
Amyl Alcohol (n)	29.6	1.2
Amyl Alcohol (iso)	29.6	1.2
Benzene	36.8	1.4 ¹
Butyl Acetate (n)	24.8	1.7
Butyl Alcohol (n)	35.2	1.4
Butyl Cellosolve	24.8	1.1
Cellosolve	33.6	1.8
Cellosolve Acetate	23.2	1.7
Cyclohexanone	31.2	1.1 ¹
1,1 Dichloroethylene	42.4	5.6
1,2 Dichloroethylene	42.4	9.7
Ethyl Acetate	32.8	2.5
Ethyl Alcohol	55.2	4.3
Ethyl Lactate	28.0	1.5 ¹
Methyl Acetate	40.0	3.1
Methyl Alcohol	80.8	7.3
Methyl Cellosolve	40.8	2.5
Methyl Ethyl Ketone	36.0	1.8
Methyl n-Propyl Ketone	30.4	1.5
Naphtha (VM&P) (76° Naphtha)	22.4	0.9
Naphtha (100° Flash)		
Safety Solvent-Stoddard Solvent	23.2	1.1
Propyl Acetate (n)	27.2	2.0
Propyl Acetate (iso)	28.0	1.8
Propyl Alcohol (n)	44.8	2.1
Propyl Alcohol (iso)	44.0	2.0
Toluene	30.4	1.4
Turpentine	20.8	0.8
Xylene (o)	26.4	1.0

¹ At 212°F.

(c)(i) When an operator must position himself in a booth downstream of the object being sprayed, an air supplied respirator or other type of respirator listed in the applicable provisions of chapter 296-62 WAC for the material being sprayed should be used by the operator.

(ii) Where downdraft booths are provided with doors, such doors shall be closed when spray painting.

(7) Make-up air.

(a) Clean fresh air, free of contamination from adjacent industrial exhaust systems, chimneys, stacks, or vents, shall be supplied to a spray booth or room in quantities equal to the volume of air exhausted through the spray booth.

(b) Where a spray booth or room receives make-up air through self-closing doors, dampers, or louvers, they shall be fully open at all times when the booth or room is in use for spraying. The velocity of air through such doors, dampers, or louvers shall not exceed 200 feet per minute. If the fan characteristics are such that the required air flow through the booth will be provided, higher velocities through the doors, dampers, or louvers may be used.

(c)(i) Where the air supply to a spray booth or room is filtered, the fan static pressure shall be calculated on the assumption that the filters are dirty to the extent that they require cleaning or replacement.

(ii) The rating of filters shall be governed by test data supplied by the manufacturer of the filter. A pressure gauge shall be installed to show the pressure drop across the filters. This gauge shall be marked to show the pressure drop at which the filters require cleaning or replacement. Filters shall be replaced or cleaned whenever the pressure drop across them becomes excessive or whenever the air flow through the face of the booth falls below that specified in Table 14.

(d)(i) Means of heating make-up air to any spray booth or room, before or at the time spraying is normally performed, shall be provided in all places where the outdoor temperature may be expected to remain below 55° F. for appreciable periods of time during the operation of the booth except where adequate and safe means of radiant heating for all operating personnel affected is provided. The replacement air during the heating seasons shall be maintained at not less than 65° F. at the point of entry into the spray booth or spray room. When otherwise unheated make-up air would be at a temperature of more than 10° F. below room temperature, its temperature shall be regulated as provided in section 3.6 of ANSI Z9.2-1960.

(ii) As an alternative to an air replacement system complying with the preceding section, general heating of the building in which the spray room or booth is located may be employed provided that all occupied parts of the building are maintained at not less than 65° F. when the exhaust system is in operation or the general heating system supplemented by other sources of heat may be employed to meet this requirement.

(iii) No means of heating make-up air shall be located in a spray booth.

(iv) Where make-up air is heated by coal or oil, the products of combustion shall not be allowed to mix with the make-up air, and the products of combustion shall be conducted outside the building through a flue terminating at a point remote from all points where make-up air enters the building.

(v) Where make-up air is heated by gas, and the products of combustion are not mixed with the make-up air but are conducted through an independent flue to a point outside the building remote from all points where make-up air enters the building, it is not necessary to comply with (7)(d)(vi) of this section.

(vi) Where make-up air to any manually operated spray booth or room is heated by gas and the products of combustion are allowed to mix with the supply air, the following precautions must be taken:

(A) The gas must have a distinctive and strong enough odor to warn workmen in a spray booth or room of its presence if in an unburned state in the make-up air.

(B) The maximum rate of gas supply to the make-up air heater burners must not exceed that which would yield in excess of 200 p.p.m. (parts per million) of carbon monoxide or 2,000 p.p.m. of total combustible gases in the mixture if the unburned gas upon the occurrence of flame failure were mixed with all of the make-up air supplied.

(C) A fan must be provided to deliver the mixture of heated air and products of combustion from the plenum chamber housing the gas burners to the spray booth or room.

(8) Scope. Spray booths or spray rooms are to be used to enclose or confine all spray finishing operations covered by this paragraph. This paragraph does not apply to the spraying of the exteriors of buildings, fixed tanks, or similar structures, nor to small portable spraying apparatus not used repeatedly in the same location.

[Statutory Authority: RCW 49.17.040, 49.17.050, and 49.17.240. 81-16-015 (Order 81-20), § 296-62-11019, filed 7/27/81; Order 73-3, § 296-62-11019, filed 5/7/73.]

WAC 296-62-11021 Open surface tanks. (1) General.

(a) This section applies to all operations involving the immersion of materials in liquids, or in the vapors of such liquids, for the purpose of cleaning or altering the surface or adding to or imparting a finish thereto or changing the character of the materials, and their subsequent removal from the liquid or vapor, draining, and drying. These operations include washing, electroplating, anodizing, pickling, quenching, dyeing, dipping, tanning, dressing, bleaching, degreasing, alkaline cleaning, stripping, rinsing, digesting, and other similar operations.

(b) Except where specific construction specifications are prescribed in this section, hoods, ducts, elbows, fans, blowers, and all other exhaust system parts, components, and supports thereof shall be so constructed as to meet conditions of service and to facilitate maintenance and shall conform in construction to the specifications contained in American National Standard Fundamentals Governing the Design and Operation of Local Exhaust Systems, Z9.2-1960.

(2) Classification of open-surface tank operations.

(a) Open-surface tank operations shall be classified into 16 classes, numbered A-1 to D-4, inclusive.

(b) Determination of class. Class is determined by two factors, hazard potential designated by a letter from A to D, inclusive, and rate of gas, vapor, or mist evolution designated by a number from 1 to 4, inclusive (for example, B.3).

(c) Hazard potential is an index, on a scale of from A to D, inclusive, of the severity of the hazard associated with the substance contained in the tank because of the toxic, flammable, or explosive nature of the vapor, gas, or mist produced therefrom. The toxic hazard is determined from the concentration, measured in parts by volume of a gas or vapor, per million parts by volume of contaminated air (ppm), or in milligrams of mist per cubic meter of air (mg/m³), below which ill effects are unlikely to occur to the exposed worker. The concentrations shall be those in WAC 296-62-075 through 296-62-07515.

(d) The relative fire or explosion hazard is measured in degrees Fahrenheit in terms of the closed-cup flash point of the substance in the tank. Detailed information on the prevention of fire hazards in dip tanks may be found in Dip Tanks Containing Flammable or Combustible Liquids, NFPA No. 34-1966, National Fire Protection Association. Where the tank contains a mixture of liquids, other than organic solvents, whose effects are additive, the hygienic standard of the most toxic component (for example, the one having the lowest ppm or mg/m³) shall be used, except where such substance constitutes an insignificantly small fraction of the mixture. For mixtures of organic solvents, their combined effect, rather than that of either individually, shall determine the hazard potential. In the absence of information to the contrary, the effects shall be considered as additive. If the sum of the ratios of the airborne concentration of that contaminant exceeds unity, the toxic concentration shall be considered to have been exceeded. (See Note A of (2)(e) of this section.)

(e) Hazard potential shall be determined from Table 16, with the value indicating greater hazard being used. When the hazardous material may be either a vapor with a permissible exposure limit in ppm or a mist with a TLV in mg/m³, the TLV indicating the greater hazard shall be used (for example, A takes precedence over B or C; B over C; C over D).

Note A:

$$\frac{c_1}{\text{PEL}} + \frac{c_2}{\text{PEL}} + \frac{c_3}{\text{PEL}} + \dots + \frac{c_N}{\text{PEL}} > 1$$

where:

c = Concentration measured at the operation in ppm.

TABLE 16
DETERMINATION OF HAZARD POTENTIAL

Hazard potential	Toxicity Group		Flash point (in degrees F.)
	Gas or vapor (ppm)	Mist (mg/m ³)	
A	0 - 10	0 - 0.1	. . . . .
B	11 - 100	0.11 - 1.0	Under 100
C	101 - 500	1.1 - 10	100-200
D	Over 500	Over 10	Over 200

(f) Rate of gas, vapor, or mist evolution is a numerical index, on a scale of from 1 to 4, inclusive, both of the relative capacity of the tank to produce gas, vapor, or mist and of the relative energy with which it is projected or carried upwards from the tank. Rate is evaluated in terms of:

(i) The temperature of the liquid in the tank in degrees Fahrenheit;

(ii) The number of degrees Fahrenheit that this temperature is below the boiling point of the liquid in degrees Fahrenheit;

(iii) The relative evaporation of the liquid in still air at room temperature in an arbitrary scale—fast, medium, slow, or nil; and

(iv) The extent that the tank gases or produces mist in an arbitrary scale—high, medium, low, and nil. (See Table 17, Note 2.) Gassing depends upon electrochemical or

mechanical processes, the effects of which have to be individually evaluated for each installation (see Table 17, Note 3).

(g) Rate of evolution shall be determined from Table 17. When evaporation and gassing yield different rates, the lowest numerical value shall be used.

TABLE 17
DETERMINATION OF RATE OF GAS,
VAPOR, OR MIST EVOLUTION¹

Rate	Liquid temperature, °F	Degrees below boiling point	Evaporation ²	Relative Gassing ³
1	Over 200	0-20	Fast	High
2	150-200	21-50	Medium	Medium
3	94-149	51-100	Slow	Low
4	Under 94	Over 100	Nil	Nil

Note 1. In certain classes of equipment, specifically vapor degreasers, an internal condenser or vapor level thermostat is used to prevent the vapor from leaving the tank during normal operations. In such cases, rate of vapor evolution from the tank into the workroom is not dependent upon the factors listed in the table, but rather upon abnormalities of operating procedure, such as carry out of vapors from excessively fast action, dragout of liquid by entrainment in parts, contamination of solvent by water and other materials, or improper heat balance. When operating procedure is excellent, effective rate of evolution may be taken as 4. When operating procedures are average, the effective rate of evolution may be taken as 3. When operation is poor, a rate of 2 or 1 is indicated, depending upon observed conditions.

Note 2. Relative evaporation rate is determined according to the methods described by A. K. Doolittle in Industrial and Engineering Chemistry, vol. 27, p. 1169, (3) where time for 100— percent evaporation is as follows: Fast: 0-3 hours; Medium: 3-12 hours; Slow: 12-50 hours; Nil: more than 50 hours.

Note 3. Gassing means the formation by chemical or electrochemical action of minute bubbles of gas under the surface of the liquid in the tank and is generally limited to aqueous solutions.

(3) Ventilation. Where ventilation is used to control potential exposures to workers as defined in (2)(c) of this section, it shall be adequate to reduce the concentration of the air contaminant to the degree that a hazard to the worker does not exist. Methods of ventilation are discussed in American National Standard Fundamentals Governing the Design and Operation of Local Exhaust Systems, Z9.2-1960.

(4) Control requirements.

(a) Control velocities shall conform to Table 18 in all cases where the flow of air past the breathing or working zone of the operator and into the hoods is undisturbed by local environmental conditions, such as open windows, wall fans, unit heaters, or moving machinery.

(b) All tanks exhausted by means of hoods which;

(i) Project over the entire tank;

(ii) Are fixed in position in such a location that the head of the workman, in all his normal operating positions while working at the tank, is in front of all hood openings; and

(iii) Are completely enclosed on at least two sides, shall be considered to be exhausted through an enclosing hood.

(iv) The quantity of air in cubic feet per minute necessary to be exhausted through an enclosing hood shall be not less than the product of the control velocity times the net

area of all openings in the enclosure through which air can flow into the hood.

TABLE 18
CONTROL VELOCITIES IN FEET PER MINUTE (F.P.M.) FOR UNDISTURBED LOCATIONS

Class (See Sub-paragraph (2) and Tables 16 and 17)	Enclosing hood (See Subparagraph (4)(ii))		Lateral exhaust ¹ (See Sub-paragraph (4)(iii))	Canopy hood ² (See Sub-paragraph (4)(iv))	
	One open side	Two open sides		Three open sides	Four open sides
A-1 and A-2	100	150	150	Do not use	Do not use
A-3 (Note 2), B-1, B-2, and C-1	75	100	100	125	175
B-3, C-2, and D-1 (Note 3)	65	90	75	100	150
A-4 (Note 2), C-3, and D-2 (Note 3)	50	75	50	75	125
B-4, C-4, D-3 (Note 3), and D-4	General room ventilation required.				

¹ See Table 19 for computation of ventilation rate.

² Do not use canopy hood for Hazard Potential A processes.

³ Where complete control of hot water is desired, design as next highest class.

(c) All tanks exhausted by means of hoods which do not project over the entire tank, and in which the direction of air movement into the hood or hoods is substantially horizontal, shall be considered to be laterally exhausted. The quantity of air in cubic feet per minute necessary to be laterally exhausted per square foot of tank area in order to maintain the required control velocity shall be determined from Table 19 for all variations in ratio of tank width (W) to tank length (L). The total quantity of air in cubic feet per minute required to be exhausted per tank shall be not less than the product of the area of tank surface times the cubic feet per minute per square foot of tank area, determined from Table 19.

(i) For lateral exhaust hoods over 42 inches wide, or where it is desirable to reduce the amount of air removed from the workroom, air supply slots or orifices shall be provided along the side or the center of the tank opposite from the exhaust slots. The design of such systems shall meet the following criteria:

(A) The supply air volume plus the entrained air shall not exceed 50 percent of the exhaust volume.

(B) The velocity of the supply airstream as it reaches the effective control area of the exhaust slot shall be less than the effective velocity over the exhaust slot area.

(C) The vertical height of the receiving exhaust hood, including any baffle, shall not be less than one-quarter the width of the tank.

(D) The supply airstream shall not be allowed to impinge on obstructions between it and the exhaust slot in such a manner as to significantly interfere with the performance of the exhaust hood.

TABLE 19
MINIMUM VENTILATION RATE IN CUBIC FEET OF AIR PER MINUTE PER SQUARE FOOT OF TANK AREA FOR LATERAL EXHAUST

Required minimum control velocity, f.p.m. (from Table)	C.f.m. per sq. ft. to maintain required minimum velocities at following ratios (tank width (W)/tank length (L)). ^{1 3}				
	0.0-0.09	0.1-0.24	0.25-0.49	0.5-0.99	1.0-2.0

Hood along one side or two parallel sides of tank when one hood is against a wall or baffle.²

Also for a manifold along tank centerline.³

50	50	60	75	90	100
75	75	90	110	130	150
100	100	125	150	175	200
150	150	190	225	260	300

Hood along one side or two parallel sides of free standing tank not against wall or baffle.

50	75	90	100	110	125
75	110	130	150	170	190
100	150	175	200	225	250
150	225	260	300	340	375

¹ It is not practicable to ventilate across the long dimension of a tank whose ratio W/L exceeds 2.0.

It is understandable to do so when W/L exceeds 1.0. For circular tanks with lateral exhaust along up the circumference use W/L = 1.0 for over one-half the circumference use W/L = 0.5.

² Baffle is a vertical plate the same length as the tank, and with the top of the plate as high as the tank is wide. If the exhaust hood is on the side of a tank against a building wall or close to it, it is perfectly baffled.

³ Use W/L as tank width in computing when manifold is along centerline, or when hoods are used on two parallel sides of a tank.

Tank Width (W) means the effective width over which the hood must pull air to operate (for example, where the hood face is not back from the edge of the tank, this set back must be added in measuring tank width). The surface area of tanks can frequently be reduced and better control obtained (particularly on conveyerized systems) by using covers extending from the upper edges of the slots toward the center of the tank.

(E) Since most failure of push-pull systems result from excessive supply air volumes and pressures, methods of measuring and adjusting the supply air shall be provided. When satisfactory control has been achieved, the adjustable features of the hood shall be fixed so that they will not be altered.

(d) All tanks exhausted by means of hoods which project over the entire tank, and which do not conform to the definition of enclosing hoods, shall be considered to be overhead canopy hoods. The quantity of air in cubic feet per minute necessary to be exhausted through a canopy hood shall be not less than the product of the control velocity

times the net area of all openings between the bottom edges of the hood and the top edges of the tank.

(e) The rate of vapor evolution (including steam or products of combustion) from the process shall be estimated. If the rate of vapor evolution is equal to or greater than 10 percent of the calculated exhaust volume required, the exhaust volume shall be increased in equal amount.

(5) Spray cleaning and degreasing. Wherever spraying or other mechanical means are used to disperse a liquid above an open-surface tank, control must be provided for the airborne spray. Such operations shall be enclosed as completely as possible. The inward air velocity into the enclosure shall be sufficient to prevent the discharge of spray into the workroom. Mechanical baffles may be used to help prevent the discharge of spray. Spray painting operations are covered in WAC 296-62-11019.

(6) Control means other than ventilation. Tank covers, foams, beads, chips, or other materials floating on the tank surface so as to confine gases, mists, or vapors to the area under the cover or to the foam, bead, or chip layer; or surface tension depressive agents added to the liquid in the tank to minimize mist formation, or any combination thereof, may all be used as gas, mist, or vapor control means for open-surface tank operations, provided that they effectively reduce the concentrations of hazardous materials in the vicinity of the worker below the limits set in accordance with (2) of this section.

(7) System design.

(a) The equipment for exhausting air shall have sufficient capacity to produce the flow of air required in each of the hoods and openings of the system.

(b) The capacity required in (7)(a) of this section shall be obtained when the airflow producing equipment is operating against the following pressure losses, the sum of which is the static pressure:

(i) Entrance losses into the hood.

(ii) Resistance to airflow in branch pipe including bends and transformations.

(iii) Entrance loss into the main pipe.

(iv) Resistance to airflow in main pipe including bends and transformations.

(v) Resistance of mechanical equipment; that is, filters, washers, condensers, absorbers, etc., plus their entrance and exit losses.

(vi) Resistance in outlet duct and discharge stack.

(c) Two or more operations shall not be connected to the same exhaust system where either one or the combination of the substances removed may constitute a fire, explosion, or chemical reaction hazard in the duct system. Traps or other devices shall be provided to insure that condensate in ducts does not drain back into any tank.

(d) The exhaust system, consisting of hoods, ducts, air mover, and discharge outlet shall be designed in accordance with American National Standard Fundamentals Governing the Design and Operation of Local Exhaust Systems, Z9.2-1960, or the manual, Industrial Ventilation, published by the American Conference of Governmental Industrial Hygienists. Airflow and pressure loss data provided by the manufacturer of any air cleaning device shall be included in the design calculations.

(8) Operation.

(a) The required airflow shall be maintained at all times during which gas, mist, or vapor is emitted from the tank, and at all times the tank, the draining, or the drying area is in operation or use. When the system is first installed, the airflow from each hood shall be measured by means of a pitot traverse in the exhaust duct and corrective action taken if the flow is less than that required. When the proper flow is obtained, the hood static pressure shall be measured and recorded. At intervals of not more than 3 months operation, or after a prolonged shutdown period, the hoods and duct system shall be inspected for evidence of corrosion or damage. In any case where the airflow is found to be less than required, it shall be increased to the required value. (Information on airflow and static pressure measurement and calculations may be found in American National Standard Fundamentals Governing the Design and Operation of Local Exhaust Systems, Z9.2-1960, or in the manual, Industrial Ventilation, published by the American Conference of Governmental Industrial Hygienists.)

(b) The exhaust system shall discharge to the outer air in such a manner that the possibility of its effluent entering any building is at a minimum. Recirculation shall only be through a device for contaminant removal which will prevent the creation of a health hazard in the room or area to which the air is recirculated.

(c) A volume of outside air in the range of 90 percent to 110 percent of the exhaust volume shall be provided to each room having exhaust hoods. The outside air supply shall enter the workroom in such a manner as not to be detrimental to any exhaust hood. The airflow of the makeup air system shall be measured on installation. Periodically, thereafter, the airflow should be remeasured, and corrective action shall be taken when the airflow is below that required. The makeup air shall be uncontaminated.

(9) Personal protection.

(a) All employees working in and around open surface tank operations must be instructed as to the hazards of their respective jobs, and in the personal protection and first aid procedures applicable to these hazards.

(b) All persons required to work in such a manner that their feet may become wet shall be provided with rubber or other impervious boots or shoes, rubbers, or wooden-soled shoes sufficient to keep feet dry.

(c) All persons required to handle work wet with a liquid other than water shall be provided with gloves impervious to such a liquid and of a length sufficient to prevent entrance of liquid into the tops of the gloves. The interior of gloves shall be kept free from corrosive or irritating contaminants.

(d) All persons required to work in such a manner that their clothing may become wet shall be provided with such aprons, coats, jackets, sleeves, or other garments made of rubber, or of other materials impervious to liquids other than water, as are required to keep their clothing dry. Aprons shall extend well below the top of boots to prevent liquid splashing into the boots. Provision of dry, clean, cotton clothing along with rubber shoes or short boots and an apron impervious to liquids other than water shall be considered a satisfactory substitute where small parts are cleaned, plated, or acid dipped in open tanks and rapid work is required.

(e) Whenever there is a danger of splashing, for example, when additions are made manually to the tanks, or when acids and chemicals are removed from the tanks, the employees so engaged shall be required to wear either tight-fitting chemical goggles or an effective face shield. (See WAC 296-24-078.)

(f) When, during emergencies as described in (11)(e) of this section, workers must be in areas where concentrations of air contaminants are greater than the limit set by (2)(c) of this section, or oxygen concentrations are less than 19.5%, they shall be required to wear respirators adequate to reduce their exposure to a level below these limits, or to provide adequate oxygen. Such respirators shall also be provided in marked, quickly accessible storage compartments built for the purpose, when there exists the possibility of accidental release of hazardous concentrations of air contaminants. Respirators shall meet the applicable provisions of chapter 296-62 WAC and shall be selected by a competent industrial hygienist or other technically qualified source. Respirators shall be used in accordance with the applicable provisions of chapter 296-62 WAC, and persons who may require them shall be trained in their use.

(g) Near each tank containing a liquid which may burn, irritate, or otherwise be harmful to the skin if splashed upon the worker's body, there shall be a supply of clean cold water. The water pipe (carrying a pressure not exceeding 25 pounds) shall be provided with a quick opening valve and at least 48 inches of hose not smaller than three-fourths inch, so that no time may be lost in washing off liquids from the skin or clothing. Alternatively, deluge showers and eye flushes shall be provided in cases where harmful chemicals may be splashed on parts of the body.

(h) Operators with sores, burns, or other skin lesions requiring medical treatment shall not be allowed to work at their regular operations until so authorized by a physician. Any small skin abrasions, cuts, rash, or open sores which are found or reported shall be treated by a properly designated person so that chance of exposures to the chemicals are removed. Workers exposed to chromic acids shall have a periodic examination made of the nostrils and other parts of the body, to detect incipient ulceration.

(i) Sufficient washing facilities, including soap, individual towels, and hot water, shall be provided for all persons required to use or handle any liquids which may burn, irritate, or otherwise be harmful to the skin, on the basis of at least one basin (or its equivalent) with a hot water faucet for every 10 employees. (See WAC 296-24-12009.)

(j) Locker space or equivalent clothing storage facilities shall be provided to prevent contamination of street clothing.

(k) First aid facilities specific to the hazards of the operations conducted shall be readily available.

(10) Special precautions for cyanide. Dikes or other arrangements shall be provided to prevent the possibility of intermixing of cyanide and acid in the event of tank rupture.

(11) Inspection, maintenance, and installation.

(a) Floors and platforms around tanks shall be prevented from becoming slippery both by original type of construction and by frequent flushing. They shall be firm, sound, and of the design and construction to minimize the possibility of tripping.

(b) Before cleaning the interior of any tank, the contents shall be drained off, and the cleanout doors shall be opened where provided. All pockets in tanks or pits, where it is possible for hazardous vapors to collect, shall be ventilated and cleared of such vapors.

(c) Tanks which have been drained to permit employees to enter for the purposes of cleaning, inspection, or maintenance may contain atmospheres which are hazardous to life or health, through the presence of flammable or toxic air contaminants, or through the absence of sufficient oxygen. Before employees shall be permitted to enter any such tank, appropriate tests of the atmosphere shall be made to determine if the limits set by (2)(c) of this section are exceeded, or if the oxygen concentration is less than 19.5%.

(d) If the tests made in accordance with (11)(c) of this section indicate that the atmosphere in the tank is unsafe, before any employee is permitted to enter the tank, the tank shall be ventilated until the hazardous atmosphere is removed, and ventilation shall be continued so as to prevent the occurrence of a hazardous atmosphere as long as an employee is in the tank.

(e) If, in emergencies, such as rescue work, it is necessary to enter a tank which may contain a hazardous atmosphere, suitable respirators, such as self-contained breathing apparatus; hose mask with blower, if there is a possibility of oxygen deficiency; or a gas mask, selected and operated in accordance with (9)(f) of this section, shall be used. If a contaminant in the tank can cause dermatitis, or be absorbed through the skin, the employee entering the tank shall also wear protective clothing. At least one trained standby employee, with suitable respirator, shall be present in the nearest uncontaminated area. The standby employee must be able to communicate with the employee in the tank and be well able to haul him out of the tank with a lifeline if necessary.

(f) Maintenance work requiring welding or open flame, where toxic metal fumes such as cadmium, chromium, or lead may be evolved, shall be done only with sufficient local exhaust ventilation to prevent the creation of a health hazard, or be done with respirators selected and used in accordance with (9)(f) of this section. Welding, or the use of open flames near any solvent cleaning equipment shall be permitted only after such equipment has first been thoroughly cleared of solvents and vapors.

(12) Vapor degreasing tanks.

(a) In any vapor degreasing tank equipped with a condenser and vapor level thermostat, the condenser or thermostat shall keep the level of vapors below the top edge of the tank by a distance at least equal to one-half the tank width, or at least 36 inches, whichever is shorter.

(b) Where gas is used as a fuel for heating vapor degreasing tanks, the combustion chamber shall be of tight construction, except for such openings as the exhaust flue, and those that are necessary for supplying air for combustion. Flues shall be of corrosion-resistant construction and shall extend to the outer air. If mechanical exhaust is used on this flue, a draft diverter shall be used. Special precautions must be taken to prevent solvent fumes from entering the combustion air of this or any other heater when chlorinated or fluorinated hydrocarbon solvents (for example, trichloroethylene; Freon) are used.

(c) Heating elements shall be so designed and maintained that their surface temperature will not cause the solvent or mixture to decompose, break down, or be converted into an excessive quantity of vapor.

(d) Tanks or machines of more than 4 square feet of vapor area, used for solvent cleaning or vapor degreasing, shall be equipped with suitable cleanout or sludge doors located near the bottom of each tank or still. These doors shall be so designed and gasketed that there will be no leakage of solvent when they are closed.

(13) Scope.

(a) This paragraph applies to all operations involving the immersion of materials in liquids, or in the vapors of such liquids, for the purpose of cleaning or altering their surfaces, or adding or imparting a finish thereto, or changing the character of the materials, and their subsequent removal from the liquids or vapors, draining, and drying. Such operations include washing, electroplating, anodizing, pickling, quenching, dyeing, dipping, tanning, dressing, bleaching, degreasing, alkaline cleaning, stripping, rinsing, digesting, and other similar operations, but do not include molten materials handling operations, or surface coating operations.

(b) "Molten materials handling operations" means all operations, other than welding, burning, and soldering operations, involving the use, melting, smelting, or pouring of metals, alloys, salts, or other similar substances in the molten state. Such operations also include heat treating baths, descaling baths, die casting stereotyping, galvanizing, tinning, and similar operations.

(c) "Surface coating operations" means all operations involving the application of protective, decorative, adhesive, or strengthening coating or impregnation to one or more surfaces, or into the interstices of any object or material, by means of spraying, spreading, flowing, brushing, roll coating, pouring, cementing, or similar means; and any subsequent draining or drying operations, excluding open-tank operations.

[Statutory Authority: Chapter 49.17 RCW. 91-24-017 (Order 91-07), § 296-62-11021, filed 11/22/91, effective 12/24/91. RCW 49.17.040, 49.17.050, and 49.17.240. 81-16-015 (Order 81-20), § 296-62-11021, filed 7/27/81; 80-11-010 (Order 80-14), § 296-62-11021, filed 8/8/80; Order 73-3, § 296-62-11021, filed 5/7/73.]

WAC 296-62-12000 Environmental tobacco smoke in office work environments—Scope and application. This regulation applies to all indoor office work environments and requires employee exposure to environmental tobacco smoke to be controlled.

[Statutory Authority: Chapter 49.17 RCW. 94-07-086 (Order 93-18), § 296-62-12000, filed 3/16/94, effective 9/1/94.]

WAC 296-62-12003 Definitions. (1) "CFM" means cubic feet per minute.

(2) "Employer" means any person, firm, corporation, partnership, business trust, legal representative, or other business entity which engages in any business, industry, profession, or activity in this state and employs one or more employees or who contracts with one or more persons, the essence of which is the personal labor of such person or persons and includes the state, counties, cities, and all municipal corporations, public corporations, political subdivi-

sions of the state, and charitable organizations: *Provided*, That any persons, partnership, or business entity not having employees, and who is covered by the Industrial Insurance Act shall be considered both an employer and an employee.

(3) "Office work environment" means an indoor or enclosed occupied space where activities such as clerical, administration, or business are transacted. It includes associated spaces controlled by the employer that office workers utilize (e.g., cafeteria or meeting rooms). It does not include production or manufacturing process areas, but does include the office areas of manufacturing and production facilities. It includes only the office areas of other firms such as food and beverage establishments, agricultural operations, construction, commercial trade, services, etc.

(4) "Smoking" means igniting, inhaling, exhaling, or carrying a pipe, cigar, or cigarette of any kind which is burning.

[Statutory Authority: Chapter 49.17 RCW. 94-07-086 (Order 93-18), § 296-62-12003, filed 3/16/94, effective 9/1/94.]

WAC 296-62-12005 Controls for environmental tobacco smoke. (1) Employers shall prohibit smoking in their office's entirety, or restrict smoking indoors to designated enclosed smoking rooms that satisfy the minimum requirements below:

(a) Designated smoking rooms shall be clearly posted.

(b) Designated smoking rooms shall be prohibited in common areas such as places where nonsmoking employees are required to work or visit, restrooms, washrooms, hallways, and stairways.

(c) No employee shall be required to enter a designated smoking room while smoking is occurring. Cleaning and maintenance work in a designated smoking room shall be conducted when no smokers are present.

(d) Designated smoking rooms shall be ventilated at rates of at least 60 cfm per smoker (calculated on the basis of the maximum number of smokers expected during the course of a normal working day), which can be supplied by transfer air from adjacent areas.

Note: This ventilation rate is recommended for occupancies of no more than seven people for every 100 square feet of net occupied space in the designated smoking room.

(e) Sufficient negative pressure shall be maintained in designated smoking rooms to prevent smoke migration to surrounding nonsmoking areas at all times.

(f) Designated smoking rooms shall operate with a separate mechanical exhaust system and be exhausted directly outside, without recirculation to nonsmoking areas.

(g) If the mechanical exhaust system for a designated smoking room is not operating properly, the employer shall prohibit the use of the room until repairs are completed.

Note: This regulation is not intended to affect structures provided for smokers such as gazebos or lean-tos external to a building that are intended to provide protection from inclement weather.

(2) The employer shall use engineering or administrative controls to minimize the infiltration of environmental tobacco smoke from sources outside the building, through air intakes, entryways, and other openings (e.g., by ensuring any outside smoking areas utilized by their employees are not in

close proximity to entryways, air intakes, and other openings that may allow airflow directly into an office).

(3) This section does not preempt any federal, state, municipal, or other local authority's regulation of indoor smoking that is more protective than this section.

Note: WAC 296-62-12009, the appendix, contains smoking cessation program information sources.

[Statutory Authority: Chapter 49.17 RCW. 94-07-086 (Order 93-18), § 296-62-12005, filed 3/16/94, effective 9/1/94.]

WAC 296-62-12007 Effective date. The effective date of WAC 296-62-12000 through 296-62-12009 shall be September 1, 1994.

[Statutory Authority: Chapter 49.17 RCW. 94-07-086 (Order 93-18), § 296-62-12007, filed 3/16/94, effective 9/1/94.]

WAC 296-62-12009 Appendix—Smoking cessation program information—Nonmandatory. The following organizations* provide smoking cessation information and program material:

(1) The National Cancer Institute operates a toll-free Cancer Information Service (CIS) with trained personnel to help you. Call 1-800-4-CANCER to reach the CIS office serving your area, or write: Office of Cancer Communications, National Cancer Institute, National Institutes of Health, Building 31, Room 10A24, Bethesda, Maryland 20892.

(2) American Cancer Society, 1599 Clifton Road NE, Atlanta, Georgia 30062, (404) 320-3333. The American Cancer Society (ACS) is a voluntary organization composed of 58 divisions and 3,100 local units. Through "The Great American Smokeout" in November, the annual Cancer Crusade in April, and numerous educational material, ACS helps people learn about the health hazards of smoking and become successful ex-smokers.

(3) American Heart Association, 7320 Greenville Avenue, Dallas, Texas 75231, (214) 750-5300. The American Heart Association (AHA) is a voluntary organization with 130,000 members (physicians, scientists, and laypersons) in 55 state and regional groups. AHA produces a variety of publications and audiovisual materials about the effects of smoking on the heart. AHA also has developed a guidebook for incorporating a weight-control component into smoking cessation programs.

(4) American Lung Association, 1740 Broadway, New York, New York 10019, (212) 245-8000. A voluntary organization of 7,500 members (physicians, nurses and laypersons), the American Lung Association (ALA) conducts numerous public information programs about the health effect of smoking. ALA has 59 state and 85 local units. The organization actively supports legislation and information campaigns for nonsmokers' rights and provides help for smokers who want to quit, for example through "Freedom From Smoking," a self-help cessation program.

(5) Office on Smoking and Health, United States Department of Health and Human Services, 5600 Fishers Lane, Park Building, Room 110, Rockville, Maryland 20857. The Office of Smoking and Health (OSH) is the Department of Health and Human Services' lead agency in smoking control. OSH has sponsored distribution of publications on smoking-related topics, such as free flyers on relapse after

initial quitting, helping a friend or family member quit smoking, the health hazards of smoking, and the effects of parental smoking on teenagers.

* Consult your local telephone directory for listing of local chapters.

[Statutory Authority: Chapter 49.17 RCW. 94-07-086 (Order 93-18), § 296-62-12009, filed 3/16/94, effective 9/1/94.]

WAC 296-62-130 Emergency washing facilities. (1) Definitions.

(a) "Emergency washing facilities" means emergency showers, eyewashes, eye/face washes, or other similar units.

(b) "Emergency shower" means a unit that enables a user to have water cascading over the entire body. It shall deliver a minimum of 113.6 liters (30 gallons) per minute of water.

(c) "Eye/face wash" means a device used to irrigate and flush both the face and eyes. It shall deliver not less than 11.4 liters (3 gallons) per minute of water for at least fifteen minutes.

(d) "Eyewash" means a device to irrigate and flush the eyes. It shall deliver not less than 1.5 liters (0.4 gallons) per minute for at least fifteen minutes.

(e) "Personal eyewash" means a portable, supplementary eyewash that supports plumbed units, self-contained units, or both, by delivering immediate flushing for less than fifteen minutes.

(f) "Contact chemical agents" are defined in WAC 296-62-07003.

(2) Facilities required.

(a) Emergency washing facilities shall be readily available in the immediate work area for workers who may be exposed to harmful concentrations of contact chemical agents. To be readily available, emergency washing facilities shall require no more than ten seconds to reach. They should be within a travel distance no greater than 15.25 meters (50 feet).

(b) Personal eyewash equipment may be used to supplement the requirement for emergency washing facilities, however, in no event shall it be used as a substitute. Such units shall deliver potable water or other medically approved eye flushing solution.

(c) All emergency washing facilities, including personal eyewash equipment, shall be periodically inspected to ensure that they function correctly and that the quality and quantity of water is satisfactory for emergency washing purposes.

(3) All emergency washing facilities using nonpotable water shall have signs stating water is nonpotable.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 85-10-004 (Order 85-09), § 296-62-130, filed 4/19/85; Order 73-3, § 296-62-130, filed 5/7/73; Order 70-8, § 296-62-130, filed 7/31/70, effective 9/1/70; Rule 13.010, effective 8/1/63.]

PART M—CONFINED SPACES

WAC 296-62-145 Permit-required confined spaces.

[Statutory Authority: Chapter 49.17 RCW. 95-04-007, § 296-62-145, filed 1/18/95, effective 3/1/95; Order 73-3, § 296-62-145 reference section, filed 5/7/73.]

WAC 296-62-14500 Scope and application. (1) Scope. This part contains minimum requirements for practices and procedures to protect employees in all industries from the hazards of entry and/or work in permit-required confined spaces.

(2) Application. Part M (Permit-required confined spaces) applies to all employers under the jurisdiction of the Washington Industrial Safety and Health Act, chapter 49.17 RCW. Part M may be augmented by more protective requirements for confined spaces or areas in vertical standards. Certain industry specific vertical standards are more protective than chapter 296-62 WAC, Part M. Where there is a conflict between an industry specific vertical standard and chapter 296-62 WAC, Part M, the vertical standard shall apply.

[Statutory Authority: Chapter 49.17 RCW. 95-04-007, § 296-62-14500, filed 1/18/95, effective 3/1/95.]

WAC 296-62-14501 Definitions. Acceptable entry conditions means the conditions that must exist in a permit space to allow entry and to ensure that employees involved with a permit-required confined space entry can safely enter into and work within the space.

Attendant means an individual stationed outside one or more permit spaces who monitors the authorized entrants and who performs all attendant's duties assigned in the employer's permit space program.

Authorized entrant means an employee who is authorized by the employer to enter a permit space.

Blanking or blinding means the absolute closure of a pipe, line, or duct by the fastening of a solid plate (such as a spectacle blind or a skillet blind) that completely covers the bore and that is capable of withstanding the maximum pressure of the pipe, line, or duct with no leakage beyond the plate.

Confined space means a space that:

(1) Is large enough and so configured that an employee can bodily enter and perform assigned work; and

(2) Has limited or restricted means for entry or exit (For example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry.); and

(3) Is not designed for continuous employee occupancy.

Double block and bleed means the closure of a line, duct, or pipe by closing and locking or tagging two in-line valves and by opening and locking or tagging a drain or vent valve in the line between the two closed valves.

Emergency means any occurrence (including any failure of hazard control or monitoring equipment) or event internal or external to the permit space that could endanger entrants.

Engulfment means the surrounding and effective capture of a person by a liquid or finely divided (flowable) solid substance that can be aspirated to cause death by filling or plugging the respiratory system or that can exert enough force on the body to cause death by strangulation, constriction, or crushing.

Entry means the action by which a person passes through an opening into a permit-required confined space. Entry includes ensuing work activities in that space and is

considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.

Entry permit (permit) means the written or printed document that is provided by the employer to allow and control entry into a permit space and that contains the information specified in WAC 296-62-14509.

Entry supervisor means the person (such as the employer, crew leader, or crew chief) responsible for determining if acceptable entry conditions are present at a permit space where entry is planned, for authorizing entry and overseeing entry operations, and for terminating entry as required by this part.

Note: An entry supervisor also may serve as an attendant or as an authorized entrant, as long as that person is trained and equipped as required by this section for each role he or she fills. Also, the duties of entry supervisor may be passed from one individual to another during the course of an entry operation.

Hazardous atmosphere means an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (that is, escape unaided from a permit space), injury, or acute illness from one or more of the following causes:

(1) Flammable gas, vapor, or mist in excess of ten percent of its lower flammable limit (LFL);

(2) Airborne combustible dust at a concentration that meets or exceeds its LFL;

Note: This concentration may be approximated as a condition in which the dust obscures vision at a distance of five feet (1.52 m) or less.

(3) Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent;

(4) Atmospheric concentration of any substance for which a dose or a permissible exposure limit is published in chapter 296-62 WAC, general occupational health standards, and which could result in employee exposure in excess of its dose or permissible exposure limit;

Note: An atmospheric concentration of any substance that is not capable of causing death, incapacitation, impairment of ability to self-rescue, injury, or acute illness due to its health effects is not covered by this provision.

(5) Any other atmospheric condition that is immediately dangerous to life or health.

Note: For air contaminants for which WISHA has not determined a dose or permissible exposure limit, other sources of information, such as material safety data sheets that comply with the Hazard Communication Standard, chapter 296-62 WAC, Part C, published information, and internal documents can provide guidance in establishing acceptable atmospheric conditions.

Hot work permit means the employer's written authorization to perform operations (for example, riveting, welding, cutting, burning, and heating) capable of providing a source of ignition.

Immediately dangerous to life or health (IDLH) means any condition that poses an immediate or delayed threat to life or that would cause irreversible adverse health effects or that would interfere with an individual's ability to escape unaided from a permit space.

Note: Some materials - hydrogen fluoride gas and cadmium vapor, for example - may produce immediate transient effects that, even if severe, may pass without medical attention, but are followed by sudden, possibly fatal collapse 12-72 hours after exposure. The

victim "feels normal" from recovery from transient effects until collapse. Such materials in hazardous quantities are considered to be "immediately" dangerous to life or health.

Inerting means the displacement of the atmosphere in a permit space by a noncombustible gas (such as nitrogen) to such an extent that the resulting atmosphere is noncombustible.

Note: This procedure produces an IDLH oxygen-deficient atmosphere.

Isolation means the process by which a permit space is removed from service and completely protected against the release of energy and material into the space by such means as: Blanking or blinding; misaligning or removing sections of lines, pipes, or ducts; a double block and bleed system; lockout or tagout of all sources of energy; or blocking or disconnecting all mechanical linkages.

Line breaking means the intentional opening of a pipe, line, or duct that is or has been carrying flammable, corrosive, or toxic material, an inert gas, or any fluid at a volume, pressure, or temperature capable of causing injury.

Nonpermit confined space means a confined space that does not contain or, with respect to atmospheric hazards, have the potential to contain any hazard capable of causing death or serious physical harm.

Oxygen deficient atmosphere means an atmosphere containing less than 19.5 percent oxygen by volume.

Oxygen enriched atmosphere means an atmosphere containing more than 23.5 percent oxygen by volume.

Permit-required confined space (permit space) means a confined space that has one or more of the following characteristics:

- (1) Contains or has a potential to contain a hazardous atmosphere;
- (2) Contains a material that has the potential for engulfing an entrant;
- (3) Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or
- (4) Contains any other recognized serious safety or health hazard.

Permit-required confined space program (permit space program) means the employer's overall program for controlling, and, where appropriate, for protecting employees from, permit space hazards and for regulating employee entry into permit spaces.

Permit system means the employer's written procedure for preparing and issuing permits for entry and for returning the permit space to service following termination of entry.

Prohibited condition means any condition in a permit space that is not allowed by the permit during the period when entry is authorized.

Rescue service means the personnel designated to rescue employees from permit spaces.

Retrieval system means the equipment (including a retrieval line, chest or full-body harness, wristlets, if appropriate, and a lifting device or anchor) used for nonentry rescue of persons from permit spaces.

Testing means the process by which the hazards that may confront entrants of a permit space are identified and

evaluated. Testing includes specifying the tests that are to be performed in the permit space.

Note: Testing enables employers both to devise and implement adequate control measures for the protection of authorized entrants and to determine if acceptable entry conditions are present immediately prior to, and during, entry.

[Statutory Authority: RCW 49.17.040, [49.17].050 and [49.17].060. 95-17-036, § 296-62-14501, filed 8/9/95, effective 9/25/95. Statutory Authority: Chapter 49.17 RCW. 95-04-007, § 296-62-14501, filed 1/18/95, effective 3/1/95; 91-24-017 (Order 91-07), § 296-62-14501, filed 11/22/91, effective 12/24/91. RCW 49.17.040, 49.17.050, and 49.17.240. 80-11-010 (Order 80-14), § 296-62-14501, filed 8/8/80; Order 73-3, § 296-62-14501, filed 5/7/73.]

WAC 296-62-14503 General requirements. (1) The employer shall evaluate the workplace to determine if any spaces are permit-required confined spaces.

Note: Proper application of the decision flow chart in WAC 296-62-14521, Appendix A, would facilitate compliance with this requirement.

(2) If the workplace contains permit spaces, the employer shall inform exposed employees, by posting danger signs or by any other equally effective means, of the existence and location of and the danger posed by the permit spaces.

Note: A sign reading "DANGER-PERMIT-REQUIRED CONFINED SPACE, DO NOT ENTER" or using other similar language would satisfy the requirement for a sign.

(3) If the employer decides that its employees will not enter permit spaces, the employer shall take effective measures to prevent its employees from entering the permit spaces and shall comply with subsections (1), (2), (6), and (8) of this section.

(4) If the employer decides that its employees will enter permit spaces, the employer shall develop and implement a written permit space program that complies with this part. The written program shall be available for inspection by employees and their authorized representatives.

(5) An employer may use the alternate procedures specified in (b) of this subsection for entering a permit space under the conditions set forth in (a) of this subsection.

(a) An employer whose employees enter a permit space need not comply with WAC 296-62-14505 through 296-62-14509 and WAC 296-62-14513 through 296-62-14519, provided that:

(i) The employer can demonstrate that the only hazard posed by the permit space is an actual or potential hazardous atmosphere;

(ii) The employer can demonstrate that continuous forced air ventilation alone is sufficient to maintain that permit space safe for entry;

(iii) The employer develops monitoring and inspection data that supports the demonstrations required by (a)(i) and (ii) of this subsection;

(iv) If an initial entry of the permit space is necessary to obtain the data required by (a)(iii) of this subsection, the entry is performed in compliance with WAC 296-62-14505 through 296-62-14519;

(v) The determinations and supporting data required by (a)(i), (ii), and (iii) of this subsection are documented by the employer and are made available to each employee who

enters the permit space under the terms of WAC this subsection; and

(vi) Entry into the permit space under the terms of (a) of this subsection is performed in accordance with the requirements of (b) of this subsection.

Note: See subsection (7) of this section for reclassification of a permit space after all hazards within the space have been eliminated.

(b) The following requirements apply to entry into permit spaces that meet the conditions set forth in (a) of this subsection.

(i) Any conditions making it unsafe to remove an entrance cover shall be eliminated before the cover is removed.

(ii) When entrance covers are removed, the opening shall be promptly guarded by a railing, temporary cover, or other temporary barrier that will prevent an accidental fall through the opening and that will protect each employee working in the space from foreign objects entering the space.

(iii) Before an employee enters the space, the internal atmosphere shall be tested, with a calibrated direct-reading instrument, for the following conditions in the order given:

- (A) Oxygen content,
- (B) Flammable gases and vapors, and
- (C) Potential toxic air contaminants.

(iv) There may be no hazardous atmosphere within the space whenever any employee is inside the space.

(v) Continuous forced air ventilation shall be used, as follows:

(A) An employee may not enter the space until the forced air ventilation has eliminated any hazardous atmosphere;

(B) The forced air ventilation shall be so directed as to ventilate the immediate areas where an employee is or will be present within the space and shall continue until all employees have left the space;

(C) The air supply for the forced air ventilation shall be from a clean source and may not increase the hazards in the space.

(vi) The atmosphere within the space shall be periodically tested as necessary to ensure that the continuous forced air ventilation is preventing the accumulation of a hazardous atmosphere.

(vii) If a hazardous atmosphere is detected during entry:

- (A) Each employee shall leave the space immediately;
- (B) The space shall be evaluated to determine how the hazardous atmosphere developed; and

(C) Measures shall be implemented to protect employees from the hazardous atmosphere before any subsequent entry takes place.

(viii) The employer shall verify that the space is safe for entry and that the preentry measures required by (b) of this subsection have been taken, through a written certification that contains the date, the location of the space, and the signature of the person providing the certification. The certification shall be made before entry and shall be made available to each employee entering the space.

(6) When there are changes in the use or configuration of a nonpermit confined space that might increase the hazards to entrants, the employer shall reevaluate that space

and, if necessary, reclassify it as a permit-required confined space.

(7) A space classified by the employer as a permit-required confined space may be reclassified as a nonpermit confined space under the following procedures:

(a) If the permit space poses no actual or potential atmospheric hazards and if all hazards within the space are eliminated without entry into the space, the permit space may be reclassified as a nonpermit confined space for as long as the nonatmospheric hazards remain eliminated.

(b) If it is necessary to enter the permit space to eliminate hazards, such entry shall be performed under WAC 296-62-14505 through 296-62-14519. If testing and inspection during that entry demonstrate that the hazards within the permit space have been eliminated, the permit space may be reclassified as a nonpermit confined space for as long as the hazards remain eliminated.

Note: Control of atmospheric hazards through forced air ventilation does not constitute elimination of the hazards. Subsection (5) of this section covers permit space entry where the employer can demonstrate that forced air ventilation alone will control all hazards in the space.

(c) The employer shall document the basis for determining that all hazards in a permit space have been eliminated, through a certification that contains the date, the location of the space, and the signature of the person making the determination. The certification shall be made available to each employee entering the space.

(d) If hazards arise within a permit space that has been declassified to a nonpermit space under this subsection, each employee in the space shall exit the space. The employer shall then reevaluate the space and determine whether it must be reclassified as a permit space, in accordance with other applicable provisions of this part.

(8) When an employer (host employer) arranges to have employees of another employer (contractor) perform work that involves permit space entry, the host employer shall:

(a) Inform the contractor that the workplace contains permit spaces and that permit space entry is allowed only through compliance with a permit space program meeting the requirements of this part;

(b) Apprise the contractor of the elements, including the hazards identified and the host employer's experience with the space, that make the space in question a permit space;

(c) Apprise the contractor of any precautions or procedures that the host employer has implemented for the protection of employees in or near permit spaces where contractor personnel will be working;

(d) Coordinate entry operations with the contractor, when both host employer personnel and contractor personnel will be working in or near permit spaces, as required by WAC 296-62-14505(11); and

(e) Debrief the contractor at the conclusion of the entry operations regarding the permit space program followed and regarding any hazards confronted or created in permit spaces during entry operations.

(9) In addition to complying with the permit space requirements that apply to all employers, each contractor who is retained to perform permit space entry operations shall:

- (a) Obtain any available information regarding permit space hazards and entry operations from the host employer;
- (b) Coordinate entry operations with the host employer, when both host employer personnel and contractor personnel will be working in or near permit spaces, as required by WAC 296-62-14505(11); and
- (c) Inform the host employer of the permit space program that the contractor will follow and of any hazards confronted or created in permit spaces, either through a debriefing or during the entry operation.

[Statutory Authority: Chapter 49.17 RCW. 95-04-007, § 296-62-14503, filed 1/18/95, effective 3/1/95; 91-11-070 (Order 91-01), § 296-62-14503, filed 5/20/91, effective 6/20/91; Order 73-3, § 296-62-14503, filed 5/7/73.]

WAC 296-62-14505 Permit-required confined space program (permit space program). Under the permit space program required by WAC 296-62-14503(4), the employer shall:

- (1) Implement the measures necessary to prevent unauthorized entry;
- (2) Identify and evaluate the hazards of permit spaces before employees enter them;
- (3) Develop and implement the means, procedures, and practices necessary for safe permit space entry operations, including, but not limited to, the following:
 - (a) Specifying acceptable entry conditions;
 - (b) Isolating the permit space;
 - (c) Purging, inerting, flushing, or ventilating the permit space as necessary to eliminate or control atmospheric hazards;
 - (d) Providing pedestrian, vehicle, or other barriers as necessary to protect entrants from external hazards; and
 - (e) Verifying that conditions in the permit space are acceptable for entry throughout the duration of an authorized entry.
- (4) Provide the following equipment (specified in (a) through (i) of this subsection) at no cost to employees, maintain that equipment properly, and ensure that employees use that equipment properly:
 - (a) Testing and monitoring equipment needed to comply with subsection (5) of this section;
 - (b) Ventilating equipment needed to obtain acceptable entry conditions;
 - (c) Communications equipment necessary for compliance with WAC 296-62-14513(3) and 296-62-14515(5);
 - (d) Personal protective equipment insofar as feasible engineering and work practice controls do not adequately protect employees;
 - (e) Lighting equipment needed to enable employees to see well enough to work safely and to exit the space quickly in an emergency;
 - (f) Barriers and shields as required by subsection (3)(d) of this section;
 - (g) Equipment, such as ladders, needed for safe ingress and egress by authorized entrants;
 - (h) Rescue and emergency equipment needed to comply with subsection (9) of this section, except to the extent that the equipment is provided by rescue services; and
 - (i) Any other equipment necessary for safe entry into and rescue from permit spaces.

(5) Evaluate permit space conditions as follows when entry operations are conducted:

- (a) Test conditions in the permit space to determine if acceptable entry conditions exist before entry is authorized to begin, except that, if isolation of the space is infeasible because the space is large or is part of a continuous system (such as a sewer), preentry testing shall be performed to the extent feasible before entry is authorized and, if entry is authorized, entry conditions shall be continuously monitored in the areas where authorized entrants are working;
- (b) Test or monitor the permit space as necessary to determine if acceptable entry conditions are being maintained during the course of entry operations; and
- (c) When testing for atmospheric hazards, test first for oxygen, then for combustible gases and vapors, and then for toxic gases and vapors.

Note: Atmospheric testing conducted in accordance with WAC 296-62-14523, Appendix B, would be considered as satisfying the requirements of this paragraph. For permit space operations in sewers, atmospheric testing conducted in accordance with Appendix B, as supplemented by WAC 296-62-14529, Appendix E, would be considered as satisfying the requirements of this subdivision.

(6) Provide at least one attendant outside the permit space into which entry is authorized for the duration of entry operations;

Note: Attendants may be assigned to monitor more than one permit space provided the duties described in WAC 296-62-14515 can be effectively performed for each permit space that is monitored. Likewise, attendants may be stationed at any location outside the permit space to be monitored as long as the duties described in WAC 296-62-14515 can be effectively performed for each permit space that is monitored. However, it is important to assess if it is appropriate or possible to have multiple permit spaces monitored by a single attendant or have attendants stationed at a location outside the monitored permit space. Due to the variability of permit space work environments, the appropriateness of how a permit space is monitored must be tailored to the requirements of the permit space and the work being performed.

(7) If multiple spaces are to be monitored by a single attendant, include in the permit program the means and procedures to enable the attendant to respond to an emergency affecting one or more of the permit spaces being monitored without distraction from the attendant's responsibilities under WAC 296-62-14515;

(8) Designate the persons who are to have active roles (as, for example, authorized entrants, attendants, entry supervisors, or persons who test or monitor the atmosphere in a permit space) in entry operations, identify the duties of each such employee, and provide each such employee with the training required by WAC 296-62-14511;

(9) Develop and implement procedures for summoning rescue and emergency services, for rescuing entrants from permit spaces, for providing necessary emergency services to rescued employees, and for preventing unauthorized personnel from attempting a rescue;

(10) Develop and implement a system for the preparation, issuance, use, and cancellation of entry permits as required by this part;

(11) Develop and implement procedures to coordinate entry operations when employees of more than one employer are working simultaneously as authorized entrants in a

permit space, so that employees of one employer do not endanger the employees of any other employer;

(12) Develop and implement procedures (such as closing off a permit space and canceling the permit) necessary for concluding the entry after entry operations have been completed;

(13) Review entry operations when the employer has reason to believe that the measures taken under the permit space program may not protect employees and revise the program to correct deficiencies found to exist before subsequent entries are authorized; and

Note: Examples of circumstances requiring the review of the permit space program are: Any unauthorized entry of a permit space, the detection of a permit space hazard not covered by the permit, the detection of a condition prohibited by the permit, the occurrence of an injury or near-miss during entry, a change in the use or configuration of a permit space, and employee complaints about the effectiveness of the program.

(14) Review the permit space program, using the canceled permits retained under WAC 296-62-14507(6) within one year after each entry and revise the program as necessary, to ensure that employees participating in entry operations are protected from permit space hazards.

Note: Employers may perform a single annual review covering all entries performed during a twelve-month period. If no entry is performed during a twelve-month period, no review is necessary.

WAC 296-62-14525, Appendix C, presents examples of permit space programs that are considered to comply with the requirements of WAC 296-62-14505.

[Statutory Authority: Chapter 49.17 RCW. 95-04-007, § 296-62-14505, filed 1/18/95, effective 3/1/95; Order 73-3, § 296-62-14505, filed 5/7/73.]

WAC 296-62-14507 Permit system. (1) Before entry is authorized, the employer shall document the completion of measures required by WAC 296-62-14505(3) by preparing an entry permit.

Note: WAC 296-62-14527, Appendix D, presents examples of permits whose elements are considered to comply with the requirements of this part.

(2) Before entry begins, the entry supervisor identified on the permit shall sign the entry permit to authorize entry.

(3) The completed permit shall be made available at the time of entry to all authorized entrants, by posting it at the entry portal or by any other equally effective means, so that the entrants can confirm that preentry preparations have been completed.

(4) The duration of the permit may not exceed the time required to complete the assigned task or job identified on the permit in accordance with WAC 296-62-14509(2).

(5) The entry supervisor shall terminate entry and cancel the entry permit when:

(a) The entry operations covered by the entry permit have been completed; or

(b) A condition that is not allowed under the entry permit arises in or near the permit space.

(6) The employer shall retain each canceled entry permit for at least one year to facilitate the review of the permit-required confined space program required by WAC 296-62-14505(14). Any problems encountered during an entry operation shall be noted on the pertinent permit so that

appropriate revisions to the permit space program can be made.

[Statutory Authority: Chapter 49.17 RCW. 95-04-007, § 296-62-14507, filed 1/18/95, effective 3/1/95. Statutory Authority: RCW 49.17.040, 49.17.050, and 49.17.240. 81-16-015 (Order 81-20), § 296-62-14507, filed 7/27/81; 80-11-010 (Order 80-14), § 296-62-14507, filed 8/8/80; Order 73-3, § 296-62-14507, filed 5/7/73.]

WAC 296-62-14509 Entry permit. The entry permit that documents compliance with this part and authorizes entry to a permit space shall identify:

(1) The permit space to be entered;

(2) The purpose of the entry;

(3) The date and the authorized duration of the entry permit;

(4) The authorized entrants within the permit space, by name or by such other means (for example, through the use of rosters or tracking systems) as will enable the attendant to determine quickly and accurately, for the duration of the permit, which authorized entrants are inside the permit space;

Note: This requirement may be met by inserting a reference on the entry permit as to the means used, such as a roster or tracking system, to keep track of the authorized entrants within the permit space.

(5) The personnel, by name, currently serving as attendants;

(6) The individual, by name, currently serving as entry supervisor, with a space for the signature or initials of the entry supervisor who originally authorized entry;

(7) The hazards of the permit space to be entered;

(8) The measures used to isolate the permit space and to eliminate or control permit space hazards before entry;

Note: Those measures can include the lockout or tagging of equipment and procedures for purging, inerting, ventilating, and flushing permit spaces.

(9) The acceptable entry conditions;

(10) The results of initial and periodic tests performed under WAC 296-62-14505(5), accompanied by the names or initials of the testers and by an indication of when the tests were performed;

(11) The rescue and emergency services that can be summoned and the means (such as the equipment to use and the numbers to call) for summoning those services;

(12) The communication procedures used by authorized entrants and attendants to maintain contact during the entry;

(13) Equipment, such as personal protective equipment, testing equipment, communications equipment, alarm systems, and rescue equipment, to be provided for compliance with this part;

(14) Any other information whose inclusion is necessary, given the circumstances of the particular confined space, in order to ensure employee safety; and

(15) Any additional permits, such as for hot work, that have been issued to authorize work in the permit space.

[Statutory Authority: Chapter 49.17 RCW. 95-04-007, § 296-62-14509, filed 1/18/95, effective 3/1/95; Order 73-3, § 296-62-14509, filed 5/7/73.]

WAC 296-62-14511 Training. (1) The employer shall provide training so that all employees whose work is

regulated by this section acquire the understanding, knowledge, and skills necessary for the safe performance of the duties assigned under this part.

(2) Training shall be provided to each affected employee:

(a) Before the employee is first assigned duties under this section;

(b) Before there is a change in assigned duties;

(c) Whenever there is a change in permit space operations that presents a hazard about which an employee has not previously been trained;

(d) Whenever the employer has reason to believe either that there are deviations from the permit space entry procedures required by WAC 296-62-14505(3) or that there are inadequacies in the employee's knowledge or use of these procedures.

(3) The training shall establish employee proficiency in the duties required by this part and shall introduce new or revised procedures, as necessary, for compliance with this part.

(4) The employer shall certify that the training required by subsections (1) through (3) of this section has been accomplished. The certification shall contain each employee's name, the signatures or initials of the trainers, and the dates of training. The certification shall be available for inspection by employees and their authorized representatives.

[Statutory Authority: Chapter 49.17 RCW. 95-04-007, § 296-62-14511, filed 1/18/95, effective 3/1/95; 91-24-017 (Order 91-07), § 296-62-14511, filed 11/22/91, effective 12/24/91; Order 73-3, § 296-62-14511, filed 5/7/73.]

WAC 296-62-14513 Duties of authorized entrants.

The employer shall ensure that all authorized entrants:

(1) Know the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;

(2) Properly use equipment as required by WAC 296-62-14505(4);

(3) Communicate with the attendant as necessary to enable the attendant to monitor entrant status and to enable the attendant to alert entrants of the need to evacuate the space as required by WAC 296-62-14515(6).

(4) Alert the attendant whenever:

(a) The entrant recognizes any warning sign or symptom of exposure to a dangerous situation, or

(b) The entrant detects a prohibited condition; and

(5) Exit from the permit space as quickly as possible whenever:

(a) An order to evacuate is given by the attendant or the entry supervisor,

(b) The entrant recognizes any warning sign or symptom of exposure to a dangerous situation,

(c) The entrant detects a prohibited condition, or

(d) An evacuation alarm is activated.

[Statutory Authority: Chapter 49.17 RCW. 95-04-007, § 296-62-14513, filed 1/18/95, effective 3/1/95; Order 73-3, § 296-62-14513, filed 5/7/73.]

WAC 296-62-14515 Duties of attendants.

The employer shall ensure that each attendant:

(1) Knows the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;

(2) Is aware of possible behavioral effects of hazard exposure in authorized entrants;

(3) Continuously maintains an accurate count of authorized entrants in the permit space and ensures that the means used to identify authorized entrants under WAC 296-62-14509(4) accurately identifies who is in the permit space;

(4) Remains outside the permit space during entry operations until relieved by another attendant;

Note: When the employer's permit entry program allows attendant entry for rescue, attendants may enter a permit space to attempt a rescue if they have been trained and equipped for rescue operations as required by WAC 296-62-14519(1) and if they have been relieved as required by subsection (4) of this section.

(5) Communicates with authorized entrants as necessary to monitor entrant status and to alert entrants of the need to evacuate the space under subsection (6) of this section;

(6) Monitors activities inside and outside the space to determine if it is safe for entrants to remain in the space and orders the authorized entrants to evacuate the permit space immediately under any of the following conditions:

(a) If the attendant detects a prohibited condition;

(b) If the attendant detects the behavioral effects of hazard exposure in an authorized entrant;

(c) If the attendant detects a situation outside the space that could endanger the authorized entrants; or

(d) If the attendant cannot effectively and safely perform all the duties required under this section;

(7) Summon rescue and other emergency services as soon as the attendant determines that authorized entrants may need assistance to escape from permit space hazards;

(8) Takes the following actions when unauthorized persons approach or enter a permit space while entry is underway:

(a) Warn the unauthorized persons that they must stay away from the permit space;

(b) Advise the unauthorized persons that they must exit immediately if they have entered the permit space; and

(c) Inform the authorized entrants and the entry supervisor if unauthorized persons have entered the permit space;

(9) Performs nonentry rescues as specified by the employer's rescue procedure; and

(10) Performs no duties that might interfere with the attendant's primary duty to monitor and protect the authorized entrants.

[Statutory Authority: Chapter 49.17 RCW. 95-04-007, § 296-62-14515, filed 1/18/95, effective 3/1/95; 91-24-017 (Order 91-07), § 296-62-14515, filed 11/22/91, effective 12/24/91. Statutory Authority: RCW 49.17.040 and 49.17.050. 83-15-017 (Order 83-19), § 296-62-14515, filed 7/13/83, effective 9/12/83; 82-13-045 (Order 82-22), § 296-62-14515, filed 6/11/82; Order 73-3, § 296-62-14515, filed 5/7/73.]

WAC 296-62-14517 Duties of entry supervisors.

The employer shall ensure that each entry supervisor:

(1) Knows the hazards that may be faced during entry, including information on the mode, signs or symptoms, and consequences of the exposure;

(2) Verifies, by checking that the appropriate entries have been made on the permit, that all tests specified by the

permit have been conducted and that all procedures and equipment specified by the permit are in place before endorsing the permit and allowing entry to begin;

(3) Terminates the entry and cancels the permit as required by WAC 296-62-14507(5);

(4) Verifies that rescue services are available and that the means for summoning them are operable;

(5) Removes unauthorized individuals who enter or who attempt to enter the permit space during entry operations; and

(6) Determines, whenever responsibility for a permit space entry operation is transferred and at intervals dictated by the hazards and operations performed within the space, that entry operations remain consistent with terms of the entry permit and that acceptable entry conditions are maintained.

[Statutory Authority: Chapter 49.17 RCW. 95-04-007, § 296-62-14517, filed 1/18/95, effective 3/1/95; Order 73-3, § 296-62-14517, filed 5/7/73.]

WAC 296-62-14519 Rescue and emergency services.

(1) The following requirements apply to employers who have employees enter permit spaces to perform rescue services.

(a) The employer shall ensure that each member of the rescue service is provided with, and is trained to use properly, the personal protective equipment and rescue equipment necessary for making rescues from permit spaces.

(b) Each member of the rescue service shall be trained to perform the assigned rescue duties. Each member of the rescue service shall also receive the training required of authorized entrants under WAC 296-62-14511.

(c) Each member of the rescue service shall practice making permit space rescues at least once every twelve months, by means of simulated rescue operations in which they remove dummies, mannequins, or actual persons from the actual permit spaces or from representative permit spaces. Representative permit spaces shall, with respect to opening size, configuration, and accessibility, simulate the types of permit spaces from which rescue is to be performed.

(d) Each member of the rescue service shall be trained in basic first-aid and in cardiopulmonary resuscitation (CPR). At least one member of the rescue service holding current certification in first aid and in CPR shall be available.

(2) When an employer (host employer) arranges to have persons other than the host employer's employees perform permit space rescue, the host employer shall:

(a) Inform the rescue service of the hazards they may confront when called on to perform rescue at the host employer's facility, and

(b) Provide the rescue service with access to all permit spaces from which rescue may be necessary so that the rescue service can develop appropriate rescue plans and practice rescue operations.

(3) To facilitate nonentry rescue, retrieval systems or methods shall be used whenever an authorized entrant enters a permit space, unless the retrieval equipment would increase the overall risk of entry or would not contribute to the rescue of the entrant. Retrieval systems shall meet the following requirements.

(a) Each authorized entrant shall use a chest or full-body harness, with a retrieval line attached at the center of the entrant's back near shoulder level, or above the entrant's head. Wristlets may be used in lieu of the chest or full-body harness if the employer can demonstrate that the use of a chest or full-body harness is infeasible or creates a greater hazard and that the use of wristlets is the safest and most effective alternative.

(b) The other end of the retrieval line shall be attached to a mechanical device or fixed point outside the permit space in such a manner that rescue can begin as soon as the rescuer becomes aware that rescue is necessary. A mechanical device shall be available to retrieve personnel from vertical type permit spaces more than five feet (1.52 m) deep.

(4) If an injured entrant is exposed to a substance for which a material safety data sheet (MSDS) or other similar written information is required to be kept at the worksite, that MSDS or written information shall be made available to the medical facility treating the exposed entrant.

[Statutory Authority: Chapter 49.17 RCW. 95-04-007, § 296-62-14519, filed 1/18/95, effective 3/1/95; 91-24-017 (Order 91-07), § 296-62-14519, filed 11/22/91, effective 12/24/91; Order 73-3, § 296-62-14519, filed 5/7/73.]

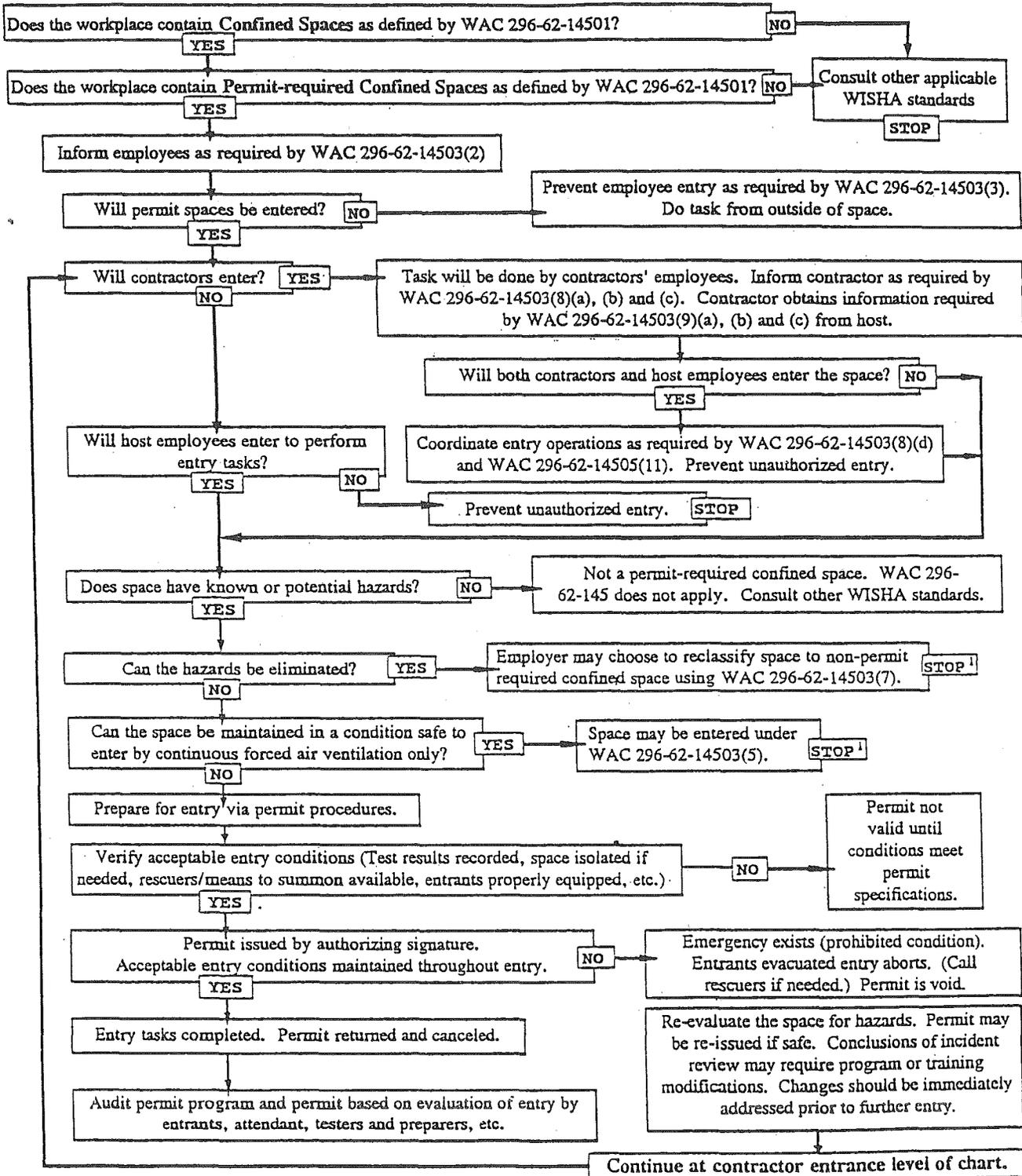
WAC 296-62-14520 Appendices to WAC 296-62-145—Permit-required confined spaces.

Note: Appendices A through E serve to provide information and nonmandatory guidelines to assist employers and employees in complying with the appropriate requirements of this part.

[Statutory Authority: Chapter 49.17 RCW. 95-04-007, § 296-62-14520, filed 1/18/95, effective 3/1/95.]

WAC 296-62-14521 Appendix A—Permit-required confined space decision flow chart.

WAC 296-62-14521 Appendix A
Permit-required Confined Space Decision Flow Chart



¹ Spaces may have to be evacuated and re-evaluated if hazards arise during entry

WAC 296-62-14523 Appendix B—Procedures for atmospheric testing. Atmospheric testing is required for two distinct purposes: Evaluation of the hazards of the permit space and verification that acceptable entry conditions for entry into that space exist.

(1) Evaluation testing. The atmosphere of a confined space should be analyzed using equipment of sufficient sensitivity and specificity to identify and evaluate any hazardous atmospheres that may exist or arise, so that appropriate permit entry procedures can be developed and acceptable entry conditions stipulated for that space. Evaluation and interpretation of these data, and development of the entry procedure, should be done by, or reviewed by, a technically qualified professional (e.g., WISHA consultation service, or certified industrial hygienist, registered safety engineer, certified safety professional, certified marine chemist, etc.) based on evaluation of all serious hazards.

(2) Verification testing. The atmosphere of a permit space which may contain a hazardous atmosphere should be tested for residues of all contaminants identified by evaluation testing using permit specified equipment to determine that residual concentrations at the time of testing and entry are within the range of acceptable entry conditions. Results of testing (i.e., actual concentration, etc.) should be recorded on the permit in the space provided adjacent to the stipulated acceptable entry condition.

(3) Duration of testing. Measurement of values for each atmospheric parameter should be made for at least the minimum response time of the test instrument specified by the manufacturer.

(4) Testing stratified atmospheres. When monitoring for entries involving a descent into atmospheres that may be stratified, the atmospheric envelope should be tested a distance of approximately four feet (1.22 m) in the direction of travel and to each side. If a sampling probe is used, the entrant's rate of progress should be slowed to accommodate the sampling speed and detector response.

(5) Order of testing. A test for oxygen is performed first because most combustible gas meters are oxygen dependent and will not provide reliable readings in an oxygen deficient atmosphere. Combustible gases are tested for next because the threat of fire or explosion is both more immediate and more life threatening, in most cases, than exposure to toxic gases and vapors. If tests for toxic gases and vapors are necessary, they are performed last.

[Statutory Authority: Chapter 49.17 RCW, 95-04-007, § 296-62-14523, filed 1/18/95, effective 3/1/95; Order 73-3, § 296-62-14523, filed 5/7/73.]

WAC 296-62-14525 Appendix C—Examples of permit-required confined space programs. Example 1. Workplace. Sewer entry.

(1) Potential hazards. The employees could be exposed to the following:

(a) Engulfment.

(b) Presence of toxic gases. Equal to or more than 10 ppm hydrogen sulfide measured as an eight-hour time-weighted average. If the presence of other toxic contaminants is suspected, specific monitoring programs will be developed.

(c) Presence of explosive/flammable gases. Equal to or greater than ten percent of the lower flammable limit (LFL).

(d) Oxygen deficiency. A concentration of oxygen in the atmosphere equal to or less than 19.5% by volume.

(2) Entry without permit/attendant:

(a) Certification. Confined spaces may be entered without the need for a written permit or attendant provided that the space can be maintained in a safe condition for entry by mechanical ventilation alone, as provided in WAC 296-62-14503(5). All spaces shall be considered permit-required confined spaces until the preentry procedures demonstrate otherwise. Any employee required or permitted to precheck or enter an enclosed/confined space shall have successfully completed, as a minimum, the training as required by the following sections of these procedures.

A written copy of operating and rescue procedures as required by these procedures shall be at the work site for the duration of the job. The confined space preentry check list must be completed by the LEAD WORKER before entry into a confined space. This list verifies completion of items listed below. This check list shall be kept at the job site for duration of the job. If circumstances dictate an interruption in the work, the permit space must be reevaluated and a new check list must be completed.

(b) Control of atmospheric and engulfment hazards.

(i) Pumps and lines. All pumps and lines which may reasonably cause contaminants to flow into the space shall be disconnected, blinded and locked out, or effectively isolated by other means to prevent development of dangerous air contamination or engulfment. Not all laterals to sewers or storm drains require blocking. However, where experience or knowledge of industrial use indicates there is a reasonable potential for contamination of air or engulfment into an occupied sewer, then all affected laterals shall be blocked. If blocking and/or isolation requires entry into the space the provisions for entry into a permit-required confined space must be implemented.

(ii) Surveillance. The surrounding area shall be surveyed to avoid hazards such as drifting vapors from the tanks, piping, or sewers.

(iii) Testing. The atmosphere within the space will be tested to determine whether dangerous air contamination and/or oxygen deficiency exists. Detector tubes, alarm only gas monitors and explosion meters are examples of monitoring equipment that may be used to test permit space atmospheres. Testing shall be performed by the LEAD WORKER who has successfully completed the gas detector training for the monitor to be used. The minimum parameters to be monitored are oxygen deficiency, LFL, and hydrogen sulfide concentration. A written record of the preentry test results shall be made and kept at the work site for the duration of the job. The supervisor will certify in writing, based upon the results of the preentry testing, that all hazards have been eliminated. Affected employees shall be able to review the testing results. The most hazardous conditions shall govern when work is being performed in two adjoining, connecting spaces.

(c) Entry procedures. If there are no nonatmospheric hazards present and if the preentry tests show there is no dangerous air contamination and/or oxygen deficiency within

the space and there is no reason to believe that any is likely to develop, entry into and work within may proceed.

Continuous testing of the atmosphere in the immediate vicinity of the workers within the space shall be accomplished. The workers will immediately leave the permit space when any of the gas monitor alarm set points are reached as defined. Workers will not return to the area until a SUPERVISOR who has completed the gas detector training has used a direct reading gas detector to evaluate the situation and has determined that it is safe to enter.

(d) Rescue. Arrangements for rescue services are not required where there is no attendant. See the rescue portion of subsection (3), below, for instructions regarding rescue planning where an entry permit is required.

(3) Entry permit required.

(a) Permits. Confined space entry permit. All spaces shall be considered permit-required confined spaces until the preentry procedures demonstrate otherwise. Any employee required or permitted to precheck or enter a permit-required confined space shall have successfully completed, as a minimum, the training as required by the following sections of these procedures.

A written copy of operating and rescue procedures as required by these procedures shall be at the work site for the duration of the job. The confined space entry permit must be completed before approval can be given to enter a permit-required confined space. This permit verifies completion of items listed below. This permit shall be kept at the job site for the duration of the job. If circumstances cause an interruption in the work or a change in the alarm conditions for which entry was approved, a new confined space entry permit must be completed.

(b) Control of atmospheric and engulfment hazards.

(i) Surveillance. The surrounding area shall be surveyed to avoid hazards such as drifting vapors from tanks, piping or sewers.

(ii) Testing. The confined space atmosphere shall be tested to determine whether dangerous air contamination and/or oxygen deficiency exists. A direct reading gas monitor shall be used. Testing shall be performed by the SUPERVISOR who has successfully completed the gas detector training for the monitor he/she will use.

The minimum parameters to be monitored are oxygen deficiency, LFL and hydrogen sulfide concentration. A written record of the preentry test results shall be made and kept at the work site for the duration of the job. Affected employees shall be able to review the testing results. The most hazardous conditions shall govern when work is being performed in two adjoining, connected spaces.

(iii) Space ventilation. Mechanical ventilation systems, where applicable, shall be set at one hundred percent outside air. Where possible, open additional manholes to increase air circulation. Use portable blowers to augment natural circulation if needed. After a suitable ventilating period, repeat the testing. Entry may not begin until testing has demonstrated that the hazardous atmosphere has been eliminated.

(c) Entry procedures. The following procedure shall be observed under any of the following conditions:

(i) Testing demonstrates the existence of dangerous or deficient conditions and additional ventilation cannot reduce concentrations to safe levels;

(ii) The atmosphere tests as safe but unsafe conditions can reasonably be expected to develop;

(iii) It is not feasible to provide for ready exit from spaces equipped with automatic fire suppression systems and it is not practical or safe to deactivate such systems; or

(iv) An emergency exists and it is not feasible to wait for preentry procedures to take effect.

(d) All personnel must be trained. A self-contained breathing apparatus shall be worn by any person entering the space. At least one worker shall stand by the outside of the space ready to give assistance in case of emergency. The standby worker shall have a self-contained breathing apparatus available for immediate use. There shall be at least one additional worker within sight or call of the standby worker. Continuous powered communications shall be maintained between the worker within the confined space and standby personnel.

(e) If at any time there is any questionable action or nonmovement by the worker inside, a verbal check will be made. If there is no response, the worker will be moved immediately.

Exception: If the worker is disabled due to falling or impact, he/she shall not be removed from the confined space unless there is immediate danger to his/her life. Local fire department rescue personnel shall be notified immediately. The standby worker may only enter the confined space in case of an emergency (wearing the self-contained breathing apparatus) and only after being relieved by another worker. Safety belt or harness with attached lifeline shall be used by all workers entering the space with the free end of the line secured outside the entry opening. The standby worker shall attempt to remove a disabled worker via his/her lifeline before entering the space.

(f) When practical, these spaces shall be entered through side openings - those within three and one-half feet (1.07 m) of the bottom. When entry must be through a top opening, the safety belt shall be of the harness type that suspends a person upright and a hoisting device or similar apparatus shall be available for lifting workers out of the space.

(g) In any situation where their use may endanger the worker, use of a hoisting device or safety belt and attached lifeline may be discontinued.

(h) When dangerous air contamination is attributable to flammable and/or explosive substances, lighting and electrical equipment shall be Class 1, Division 1 rated per National Electrical Code and no ignition sources shall be introduced into the area.

(i) Continuous gas monitoring shall be performed during all confined space operations. If alarm conditions change adversely, entry personnel shall exit the confined space and a new confined space permit issued.

(j) Rescue. Call the fire department services for rescue. Where immediate hazards to injured personnel are present, workers at the site shall implement emergency procedures to fit the situation.

Example 2. Workplace. Meat and poultry rendering plants.

Cookers and dryers are either batch or continuous in their operation. Multiple batch cookers are operated in parallel. When one unit of a multiple set is shut down for

repairs, means are available to isolate that unit from the others which remain in operation.

Cookers and dryers are horizontal, cylindrical vessels equipped with a center, rotating shaft and agitator paddles or discs. If the inner shell is jacketed, it is usually heated with steam at pressures up to 150 psig (1034.25 kPa). The rotating shaft assembly of the continuous cooker or dryer is also steam heated.

(1) Potential hazards. The recognized hazards associated with cookers and dryers are the risk that employees could be:

- (a) Struck or caught by rotating agitator;
- (b) Engulfed in raw material or hot, recycled fat;
- (c) Burned by steam from leaks into the cooker/dryer steam jacket or the condenser duct system if steam valves are not properly closed and locked out;
- (d) Burned by contact with hot metal surfaces, such as the agitator shaft assembly, or inner shell of the cooker/dryer;
- (e) Heat stress caused by warm atmosphere inside cooker/dryer;
- (f) Slipping and falling on grease in the cooker/dryer;
- (g) Electrically shocked by faulty equipment taken into the cooker/dryer;
- (h) Burned or overcome by fire or products of combustion; or
- (i) Overcome by fumes generated by welding or cutting done on grease covered surfaces.

(2) Permits. The supervisor in this case is always present at the cooker/dryer or other permit entry confined space when entry is made. The supervisor must follow the preentry isolation procedures described in the entry permit in preparing for entry, and ensure that the protective clothing, ventilating equipment and any other equipment required by the permit are at the entry site.

(3) Control of hazards. Mechanical. Lock out main power switch to agitator motor at main power panel. Affix tag to the lock to inform others that a permit entry confined space entry is in progress.

(4) Engulfment. Close all valves in the raw material blow line. Secure each valve in its closed position using chain and lock. Attach a tag to the valve and chain warning that a permit entry confined space entry is in progress. The same procedure shall be used for securing the fat recycle valve.

(5) Burns and heat stress. Close steam supply valves to jacket and secure with chains and tags. Insert solid blank at flange in cooker vent line to condenser manifold duct system. Vent cooker/dryer by opening access door at discharge end and top center door to allow natural ventilation throughout the entry. If faster cooling is needed, use a portable ventilation fan to increase ventilation. Cooling water may be circulated through the jacket to reduce both outer and inner surface temperatures of cooker/dryers faster. Check air and inner surface temperatures in cooker/dryer to assure they are within acceptable limits before entering, or use proper protective clothing.

(6) Fire and fume hazards. Careful site preparation, such as cleaning the area within four inches (10.16 cm) of all welding or torch cutting operations, and proper ventilation are the preferred controls. All welding and cutting opera-

tions shall be done in accordance with the requirements of chapter 296-24 WAC, Part I, Welding, cutting, and brazing. Proper ventilation may be achieved by local exhaust ventilation, or the use of portable ventilation fans, or a combination of the two practices.

(7) Electrical shock. Electrical equipment used in cooker/dryers shall be in serviceable condition.

(8) Slips and falls. Remove residual grease before entering cooker/dryer.

(9) Attendant. The supervisor shall be the attendant for employees entering cooker/dryers.

(10) Permit. The permit shall specify how isolation shall be done and any other preparations needed before making entry. This is especially important in parallel arrangements of cooker/dryers so that the entire operation need not be shut down to allow safe entry into one unit.

(11) Rescue. When necessary, the attendant shall call the employer's trained rescue team or the local fire services as previously arranged.

Example 3. Workplace. Workplaces where tank cars, trucks, and trailers, dry-bulk tanks and trailers, railroad tank cars, and similar portable tanks are fabricated or serviced.

(1) During fabrication. These tanks and dry-bulk carriers are entered repeatedly throughout the fabrication process. These products are not configured identically, but the manufacturing processes by which they are made are very similar.

(a) Sources of hazards. In addition to the mechanical hazards arising from the risks that an entrant would be injured due to contact with components of the tank or the tools being used, there is also the risk that a worker could be injured by breathing fumes from welding materials or mists or vapors from materials used to coat the tank interior. In addition, many of these vapors and mists are flammable, so the failure to properly ventilate a tank could lead to a fire or explosion.

(b) Control of hazards.

(i) Welding. Local exhaust ventilation shall be used to remove welding fumes once the tank or carrier is completed to the point that workers may enter and exit only through a manhole. (Follow the requirements of chapter 296-24 WAC, Part I, Welding, cutting and brazing, at all times.) Welding gas tanks may never be brought into a tank or carrier that is a permit entry confined space.

(ii) Application of interior coatings/linings. Atmospheric hazards shall be controlled by forced air ventilation sufficient to keep the atmospheric concentration of flammable materials below ten percent of the lower flammable limit (LFL) (or lower explosive limit (LEL), whichever term is used locally). The appropriate respirators are provided and shall be used in addition to providing forced ventilation if the forced ventilation does not maintain acceptable respiratory conditions.

(c) Permits. Because of the repetitive nature of the entries in these operations, an "area entry permit" will be issued for a one-month period to cover those production areas where tanks are fabricated to the point that entry and exit are made using manholes.

(d) Authorization. Only the area supervisor may authorize an employee to enter a tank within the permit area. The area supervisor must determine that conditions in the

tank trailer, dry-bulk trailer or truck, etc., meet permit requirements before authorizing entry.

(e) Attendant. The area supervisor shall designate an employee to maintain communication by employer specified means with employees working in tanks to ensure their safety. The attendant may not enter any permit entry confined space to rescue an entrant or for any other reason, unless authorized by the rescue procedure and, and even then, only after calling the rescue team and being relieved by an attendant by another worker.

(f) Communications and observation. Communications between attendant and entrant(s) shall be maintained throughout entry. Methods of communication that may be specified by the permit include voice, voice-powered radio, tapping or rapping codes on tank walls, signaling tugs on a rope, and the attendant's observation that work activities such as chipping, grinding, welding, spraying, etc., which require deliberate operator control continue normally. These activities often generate so much noise that the necessary hearing protection makes communication by voice difficult.

(g) Rescue procedures. Acceptable rescue procedures include entry by a team of employee-rescuers, use of public emergency services, and procedures for breaching the tank. The area permit specifies which procedures are available, but the area supervisor makes the final decision based on circumstances. (Certain injuries may make it necessary to breach the tank to remove a person rather than risk additional injury by removal through an existing manhole. However, the supervisor must ensure that no breaching procedure used for rescue would violate terms of the entry permit. For instance, if the tank must be breached by cutting with a torch, the tank surfaces to be cut must be free of volatile or combustible coatings within four inches (10.16 cm) of the cutting line and the atmosphere within the tank must be below the LFL.)

(h) Retrieval line and harnesses. The retrieval lines and harnesses generally required under this standard are usually impractical for use in tanks because the internal configuration of the tanks and their interior baffles and other struc-

tures would prevent rescuers from hauling out injured entrants. However, unless the rescue procedure calls for breaching the tank for rescue, the rescue team shall be trained in the use of retrieval lines and harnesses for removing injured employees through manholes.

(2) Repair or service of "used" tanks and bulk trailers.

(a) Sources of hazards. In addition to facing the potential hazards encountered in fabrication or manufacturing, tanks or trailers which have been in service may contain residues of dangerous materials, whether left over from the transportation of hazardous cargoes or generated by chemical or bacterial action on residues of nonhazardous cargoes.

(b) Control of atmospheric hazards. A "used" tank shall be brought into areas where tank entry is authorized only after the tank has been emptied, cleansed (without employee entry) of any residues, and purged of any potential atmospheric hazards.

(c) Welding. In addition to tank cleaning for control of atmospheric hazards, coating and surface materials shall be removed four inches (10.16 cm) or more from any surface area where welding or other torch work will be done and care taken that the atmosphere within the tank remains well below the LFL. (Follow the requirements of chapter 296-24 WAC, Part I, Welding, cutting and brazing, at all times.)

(d) Permits. An entry permit valid for up to one year shall be issued prior to authorization of entry into used tank trailers, dry-bulk trailers or trucks. In addition to the preentry cleaning requirement, this permit shall require the employee safeguards specified for new tank fabrication or construction permit areas.

(e) Authorization. Only the area supervisor may authorize an employee to enter a tank trailer, dry-bulk trailer or truck within the permit area. The area supervisor must determine that the entry permit requirements have been met before authorizing entry.

[Statutory Authority: Chapter 49.17 RCW. 95-04-007, § 296-62-14525, filed 1/18/95, effective 3/1/95; 91-24-017 (Order 91-07), § 296-62-14525, filed 11/22/91, effective 12/24/91. Statutory Authority: RCW 49.17.040 and 49.17.050. 82-03-023 (Order 82-1), § 296-62-14525, filed 1/15/82; Order 73-3, § 296-62-14525, filed 5/7/73.]

WAC 296-62-14527, Appendix D, Sample A

Confined Space Entry Permit

Date & Time Issued: _____
Job site/Space I.D.: _____
Equipment to be worked on: _____

Date & Time Expires: _____
Job Supervisor: _____
Work to be performed: _____

Stand-by personnel _____

1. Atmospheric Checks: Time _____
Oxygen _____ %
Explosive _____ % L.F.L.
Toxic _____ PPM

2. Tester's signature _____
3. Source isolation (No Entry): N/A YES NO
Pumps or lines blinded, () () ()
disconnected, or blocked () () ()

4. Ventilation Modification: N/A YES NO
Mechanical () () ()
Natural Ventilation only () () ()

5. Atmospheric check after isolation and Ventilation:
Oxygen _____ % > 19.5%
Explosive _____ % L.F.L. < 10 %
Toxic _____ PPM < 10 PPM H₂S
Time _____
Testers signature _____

6. Communication procedures: _____

7. Rescue procedures: _____

8. Entry, standby, and back up persons: Yes No
Successfully completed required training? () ()
Is it current? () ()

9. Equipment: N/A Yes No
Direct reading gas monitor - tested () () ()
Safety harnesses and lifelines for entry and standby persons () () ()
Hoisting equipment () () ()
Powered communications () () ()
SCBA's for entry and standby persons () () ()
Protective Clothing () () ()
All electric equipment listed Class I, Division I, Group D and Non-sparking tools () () ()

10. Periodic atmospheric tests:
Oxygen _____ % Time _____ Oxygen _____ % Time _____
Oxygen _____ % Time _____ Oxygen _____ % Time _____
Explosive _____ % Time _____ Explosive _____ % Time _____
Explosive _____ % Time _____ Explosive _____ % Time _____
Toxic _____ % Time _____ Toxic _____ % Time _____
Toxic _____ % Time _____ Toxic _____ % Time _____

We have reviewed the work authorized by this permit and the information contained here-in. Written instructions and safety procedures have been received and are understood. Entry cannot be approved if any squares are marked in the "No" column. This permit is not valid unless all appropriate items are completed.

Permit Prepared By: (Supervisor) _____

Approved By: (Unit Supervisor) _____

Reviewed By: (Cs Operations Personnel) _____
(printed name) (signature)

This permit to be kept at job site. Return job site copy to Safety Office following job completion.

HAC 296-62-14527, Appendix D, Sample B ENTRY PERMIT
 PERMIT VALID FOR 8 HOURS ONLY. ALL PERMIT COPIES REMAIN AT SITE UNTIL JOB COMPLETED.

DATE: - - SITE LOCATION/DESCRIPTION _____
 PURPOSE OF ENTRY _____
 SUPERVISOR(S) in charge of crews. Type of Crew Phone # _____

COMMUNICATION PROCEDURES _____
 RESCUE PROCEDURES (PHONE NUMBERS AT BOTTOM) _____

BOLD DENOTES MINIMUM REQUIREMENTS TO BE COMPLETED AND REVIEWED PRIOR TO ENTRY

REQUIREMENTS COMPLETED	DATE	TIME	REQUIREMENTS COMPLETED	DATE	TIME
LockOut/De-energize/Try-out	_____	_____	Full Body Harness w/"D" ring	_____	_____
Line(s) Broken-Capped-Blank	_____	_____	Emergency Escape Retrieval Eq	_____	_____
Purge-Flush and Vent	_____	_____	Lifelines	_____	_____
Ventilation	_____	_____	Fire Extinguishers	_____	_____
Secure Area (Post and Flag)	_____	_____	Lighting (Explosive Proof)	_____	_____
Breathing Apparatus	_____	_____	Protective Clothing	_____	_____
Resuscitator - Inhalator	_____	_____	Respirator(s) (Air Purifying)	_____	_____
Standby Safety Personnel	_____	_____	Burning and Welding Permit	_____	_____

Note: Items that do not apply enter N/A in the blank.

**** RECORD CONTINUOUS MONITORING RESULTS EVERY 2 HOURS ****

CONTINUOUS MONITORING**	Permissible	Entry Level	_____	_____	_____	_____	_____	_____	_____
TEST(S) TO BE TAKEN	Entry Level	_____	_____	_____	_____	_____	_____	_____	_____
PERCENT OF OXYGEN	19.5% to 23.5%	_____	_____	_____	_____	_____	_____	_____	_____
LOWER FLAMMABLE LIMIT	Under 10%	_____	_____	_____	_____	_____	_____	_____	_____
CARBON MONOXIDE	+35 PPM	_____	_____	_____	_____	_____	_____	_____	_____
Aromatic Hydrocarbon	+ 1 PPM * 5 PPM	_____	_____	_____	_____	_____	_____	_____	_____
Hydrogen Cyanide	(Skin) * 4 PPM	_____	_____	_____	_____	_____	_____	_____	_____
Hydrogen Sulfide	+10 PPM * 15 PPM	_____	_____	_____	_____	_____	_____	_____	_____
Sulfur Dioxide	+ 2 PPM * 5 PPM	_____	_____	_____	_____	_____	_____	_____	_____
Ammonia	* 35 PPM	_____	_____	_____	_____	_____	_____	_____	_____

* Short-term exposure limit: Employee can work in the area up to 15 minutes.
 + 8 hr. Time Weighted Avg.: Employee can work in area 8 hrs (longer with appropriate respiratory protection).

REMARKS: _____
 GAS TESTER NAME & CHECK # INSTRUMENT(S) USED MODEL &/OR TYPE SERIAL &/OR UNIT #

SAFETY STANDBY PERSON IS REQUIRED FOR ALL CONFINED SPACE WORK
 SAFETY STANDBY PERSON(S) CHECK # CONFINED SPACE ENTRANT(S) CHECK # CONFINED SPACE ENTRANT(S) CHECK #

SUPERVISOR AUTHORIZATION - ALL CONDITIONS SATISFIED DEPARTMENT/PHONE # _____
 ABULANCE # _____ FIRE # _____ Safety # _____ Gas Coordinator # _____

Title 296 WAC: Labor and Industries, Department of

296-62-14527

[Statutory Authority: Chapter 49.17 RCW. 95-04-007, § 296-62-14527, filed 1/18/95, effective 3/1/95; Order 73-3, § 296-62-14527, filed 5/7/73.]

[Title 296 WAC—page 1572]

(1997 Ed.)

WAC 296-62-14529 Appendix E—Sewer system entry. Sewer entry differs in three vital respects from other permit entries:

- There rarely exists any way to completely isolate the space (a section of a continuous system) to be entered;
- Because isolation is not complete, the atmosphere may suddenly and unpredictably become lethally hazardous (toxic, flammable or explosive) from causes beyond the control of the entrant or employer; and
- Experienced sewer workers are especially knowledgeable in entry and work in their permit spaces because of their frequent entries. Unlike other employments where permit space entry is a rare and exceptional event, sewer workers' usual work environment is a permit space.

(1) Adherence to procedure. The employer should designate as entrants only employees who are thoroughly trained in the employer's sewer entry procedures and who demonstrate that they follow these entry procedures exactly as prescribed when performing sewer entries.

(2) Atmospheric monitoring. Entrants should be trained in the use of, and be equipped with, atmospheric monitoring equipment which sounds an audible alarm, in addition to its visual readout, whenever one of the following conditions is encountered: Oxygen concentration less than 19.5 percent; flammable gas or vapor at ten percent or more of the lower flammable limit (LFL); or hydrogen sulfide or carbon monoxide at or above 10 ppm or 35 ppm, respectively, measured as an eight-hour time-weighted average.

Atmospheric monitoring equipment needs to be calibrated according to the manufacturer's instructions. The oxygen sensor/broad range sensor is best suited for initial use in situations where the actual or potential contaminants have not been identified, because broad range sensors, unlike substance-specific sensors, enable employers to obtain an overall reading of the hydrocarbons (flammables) present in the space.

However, such sensors only indicate that a hazardous threshold of a class of chemicals has been exceeded. They do not measure the levels of contamination of specific substances. Therefore, substance-specific devices, which measure the actual levels of specific substances, are best suited for use where actual and potential contaminants have been identified.

The measurements obtained with substance-specific devices are of vital importance to the employer when decisions are made concerning the measures necessary to protect entrants (such as ventilation or personal protective equipment) and the setting and attainment of appropriate entry conditions. However, the sewer environment may suddenly and unpredictably change, and the substance-specific devices may not detect the potentially lethal atmospheric hazards which may enter the sewer environment.

(a) Although WISHA considers the information and guidance provided above to be appropriate and useful in most sewer entry situations, the department emphasizes that each employer must consider the unique circumstances, including the predictability of the atmosphere, of the sewer permit spaces in the employer's workplace in preparing for entry. Only the employer can decide, based upon his or her knowledge of, and experience with permit spaces in sewer

systems, what the best type of testing instrument may be for any specific entry operation.

(b) The selected testing instrument should be carried and used by the entrant in sewer line work to monitor the atmosphere in the entrant's environment, and in advance of the entrant's direction of movement, to warn the entrant of any deterioration in atmospheric condition. Where several entrants are working together in the same immediate location, one instrument, used by the lead entrant, is acceptable.

(3) Surge flow and flooding. Sewer crews should develop and maintain liaison, to the extent possible, with the local weather bureau and fire and emergency services in their area so that sewer work may be delayed or interrupted and entrants withdrawn whenever sewer lines might be suddenly flooded by rain or fire suppression activities, or whenever flammable or other hazardous materials are released into sewers during emergencies by industrial or transportation accidents.

(4) Special equipment. Entry into large bore sewers may require the use of special equipment. Such equipment might include such items as atmosphere monitoring devices with automatic audible alarms, escape self-contained breathing apparatus (ESCBA) with at least ten minute air supply (or other NIOSH approved self-rescuer), and waterproof flashlights, and may also include boats and rafts, radios and rope stand-offs for pulling around bends and corners as needed.

[Statutory Authority: RCW 49.17.040, [49.17].050 and [49.17].060. 95-17-036, § 296-62-14529, filed 8/9/95, effective 9/25/95. Statutory Authority: Chapter 49.17 RCW. 95-04-007, § 296-62-14529, filed 1/18/95, effective 3/1/95; Order 73-3, § 296-62-14529, filed 5/7/73.]

PART N—COTTON DUST

WAC 296-62-14533 Cotton dust. (1) Scope and application.

(a) This section, in its entirety, applies to the control of employee exposure to cotton dust in all workplaces where employees engage in yarn manufacturing, engage in slashing and weaving operations, or work in waste houses for textile operations.

(b) This section does not apply to the handling or processing of woven or knitted materials; to maritime operations covered by chapters 296-56 and 296-304 WAC; to harvesting or ginning of cotton; or to the construction industry.

(c) Only subsection (8) Medical surveillance, subsection (11) (b) Medical surveillance, subsection (11)(c) Availability, subsection (11)(d) Transfer of records, and Appendices B, C, and D of this section apply in all work places where employees exposed to cotton dust engage in cottonseed processing or waste processing operations.

(d) This section applies to yarn manufacturing and slashing and weaving operations exclusively using washed cotton (as defined by subsection (14) of this section) only to the extent specified by subsection (14) of this section.

(e) This section, in its entirety, applies to the control of all employees exposure to the cotton dust generated in the preparation of washed cotton from opening until the cotton is thoroughly wetted.

(f) This section does not apply to knitting, classing or warehousing operations except that employers with these operations, if requested by WISHA, shall grant WISHA access to their employees and workplaces for exposure monitoring and medical examinations for purposes of a health study to be performed by WISHA on a sampling basis.

(2) Definitions applicable to this section:

(a) "Blow down" - the cleaning of equipment and surfaces with compressed air.

(b) "Blow off" - the use of compressed air for cleaning of short duration and usually for a specific machine or any portion of a machine.

(c) "Cotton dust" - dust present in the air during the handling or processing of cotton, which may contain a mixture of many substances including ground-up plant matter, fiber, bacteria, fungi, soil, pesticides, noncotton plant matter and other contaminants which may have accumulated with the cotton during the growing, harvesting and subsequent processing or storage periods. Any dust present during the handling and processing of cotton through the weaving or knitting of fabrics, and dust present in other operations or manufacturing processes using raw or waste cotton fibers or cotton fiber byproducts from textile mills are considered cotton dust within this definition. Lubricating oil mist associated with weaving operations is not considered cotton dust.

(d) "Director" - the director of labor and industries or his authorized representative.

(e) "Equivalent instrument" - a cotton dust sampling device that meets the vertical elutriator equivalency requirements as described in subsection (4)(a)(iii) of this section.

(f) "Lint-free respirable cotton dust" - particles of cotton dust of approximately 15 microns or less aerodynamic equivalent diameter.

(g) "Vertical elutriator cotton dust sampler" or "vertical elutriator" - a dust sampler which has a particle size cut-off at approximately 15 microns aerodynamic equivalent diameter when operating at the flow rate of 7.4 ± 0.2 liters per minute.

(h) "Waste processing" - waste recycling (sorting, blending, cleaning and willowing) and garnetting.

(i) "Yarn manufacturing" - all textile mill operations from opening to, but not including, slashing and weaving.

(3) Permissible exposure limits and action levels.

(a) Permissible exposure limits (PEL).

(i) The employer shall assure that no employee who is exposed to cotton dust in yarn manufacturing and cotton washing operations is exposed to airborne concentrations of lint-free respirable cotton dust greater than $200 \mu\text{g}/\text{m}^3$ mean concentration, averaged over an eight-hour period, as measured by a vertical elutriator or an equivalent instrument.

(ii) The employer shall assure that no employee who is exposed to cotton dust in textile mill waste house operations or is exposed in yarn manufacturing to dust from "lower grade washed cotton" as defined in subsection (14)(e) of this section is exposed to airborne concentrations of lint-free respirable cotton dust greater than $500 \mu\text{g}/\text{m}^3$ mean concentration, averaged over an eight-hour period, as measured by a vertical elutriator or an equivalent instrument.

(iii) The employer shall assure that no employee who is exposed to cotton dust in the textile processes known as slashing and weaving is exposed to airborne concentrations of lint-free respirable cotton dust greater than $750 \mu\text{g}/\text{m}^3$ mean concentration, averaged over an eight-hour period, as measured by a vertical elutriator or an equivalent instrument.

(b) Action levels.

(i) The action level for yarn manufacturing and cotton washing operations is an airborne concentration of lint-free respirable cotton dust of $100 \mu\text{g}/\text{m}^3$ mean concentration, averaged over an eight-hour period, as measured by a vertical elutriator or an equivalent instrument.

(ii) The action level for waste houses for textile operations is an airborne concentration of lint-free respirable cotton dust of $250 \mu\text{g}/\text{m}^3$ mean concentration, averaged over an eight-hour period, as measured by a vertical elutriator or an equivalent instrument.

(iii) The action level for the textile processes known as slashing and weaving is an airborne concentration of lint-free respirable cotton dust of $375 \mu\text{g}/\text{m}^3$ mean concentration, averaged over an eight-hour period, as measured by a vertical elutriator or an equivalent instrument.

(4) Exposure monitoring and measurement.

(a) General.

(i) For the purposes of this section, employee exposure is that exposure which would occur if the employee were not using a respirator.

(ii) The sampling device to be used shall be either the vertical elutriator cotton dust sampler or an equivalent instrument.

(iii) If an alternative to the vertical elutriator cotton dust sampler is used, the employer shall establish equivalency by demonstrating that the alternative sampling devices:

(A) It collects respirable particulates in the same range as the vertical elutriator (approximately 15 microns);

(B) Replicate exposure data used to establish equivalency are collected in side-by-side field and laboratory comparisons; and

(C) A minimum of 100 samples over the range of 0.5 to 2 times the permissible exposure limit are collected, and ninety percent of these samples have an accuracy range of plus or minus twenty-five percent of the vertical elutriator reading with a ninety-five percent confidence level as demonstrated by a statistically valid protocol. (An acceptable protocol for demonstrating equivalency is described in Appendix E of this section.)

(iv) WISHA will issue a written opinion stating that an instrument is equivalent to a vertical elutriator cotton dust sampler if:

(A) A manufacturer or employer requests an opinion in writing and supplies the following information:

(I) Sufficient test data to demonstrate that the instrument meets the requirements specified in this paragraph and the protocol specified in Appendix E of this section;

(II) Any other relevant information about the instrument and its testing requested by WISHA; and

(III) A certification by the manufacturer or employer that the information supplied is accurate, and

(B) If WISHA finds, based on information submitted about the instrument, that the instrument meets the requirements for equivalency specified by this subsection.

(b) Initial monitoring. Each employer who has a place of employment within the scope of subsections (1)(a), (d) or (e) of this section shall conduct monitoring by obtaining measurements which are representative of the exposure of all employees to airborne concentrations of lint-free respirable cotton dust over an eight-hour period. The sampling program shall include at least one determination during each shift for each work area.

(c) Periodic monitoring.

(i) If the initial monitoring required by (4)(b) of this section or any subsequent monitoring reveals employee exposure to be at or below the permissible exposure limit, the employer shall repeat the monitoring for those employees at least annually.

(ii) If the initial monitoring required by (4)(b) of this section or any subsequent monitoring reveals employee exposure to be above the PEL, the employer shall repeat the monitoring for those employees at least every six months.

(iii) Whenever there has been a production, process, or control change which may result in new or additional exposure to cotton dust, or whenever the employer has any other reason to suspect an increase in employee exposure, the employer shall repeat the monitoring and measurements for those employees affected by the change or increase.

(d) Employee notification.

(i) Within twenty working days after the receipt of monitoring results, the employer shall notify each employee in writing of the exposure measurements which represent that employee's exposure.

(ii) Whenever the results indicate that the employee's exposure exceeds the applicable permissible exposure limit specified in subsection (3) of this section, the employer shall include in the written notice a statement that the permissible exposure limit was exceeded and a description of the corrective action taken to reduce exposure below the permissible exposure limit.

(5) Methods of compliance.

(a) Engineering and work practice controls. The employer shall institute engineering and work practice controls to reduce and maintain employee exposure to cotton dust at or below the permissible exposure limit specified in subsection (3) of this section, except to the extent that the employer can establish that such controls are not feasible.

(b) Whenever feasible engineering and work practice controls are not sufficient to reduce employee exposure to or below the permissible exposure limit, the employer shall nonetheless institute these controls to immediately reduce exposure to the lowest feasible level, and shall supplement these controls with the use of respirators which shall comply with the provisions of subsection (6) of this section.

(c) Compliance program.

(i) Where the most recent exposure monitoring data indicates that any employee is exposed to cotton dust levels greater than the permissible exposure limit, the employer shall establish and implement a written program sufficient to reduce exposures to or below the permissible exposure limit solely by means of engineering controls and work practices as required by (a) of this subsection.

(ii) The written program shall include at least the following:

(A) A description of each operation or process resulting in employee exposure to cotton dust;

(B) Engineering plans and other studies used to determine the controls for each process;

(C) A report of the technology considered in meeting the permissible exposure limit;

(D) Monitoring data obtained in accordance with subsection (4) of this section;

(E) A detailed schedule for development and implementation of engineering and work practice controls, including exposure levels projected to be achieved by such controls;

(F) Work practice program; and

(G) Other relevant information.

(iii) The employer's schedule as set forth in the compliance program, shall project completion of the implementation of the compliance program no later than March 27, 1984 or as soon as possible if monitoring after March 27, 1984 reveals exposures over the PEL, except as provided in (13)(b)(ii)(B) of this section.

(iv) The employer shall complete the steps set forth in his program by the dates in the schedule.

(v) Written programs shall be submitted, upon request, to the director, and shall be available at the worksite for examination and copying by the director, and any affected employee or their designated representatives.

(vi) The written programs required under subsection (5)(c) of this section shall be revised and updated at least every six months to reflect the current status of the program and current exposure levels.

(d) Mechanical ventilation. When mechanical ventilation is used to control exposure, measurements which demonstrate the effectiveness of the system to control exposure, such as capture velocity, duct velocity, or static pressure shall be made at reasonable intervals.

(6) Use of respirators.

(a) General. Where the use of respirators is required under this section, the employer shall provide, at no cost to the employee, and assure the use of respirators which comply with the requirements of this subsection (6). Respirators shall be used in the following circumstances:

(i) During the time periods necessary to install or implement feasible engineering controls and work practice controls;

(ii) During maintenance and repair activities in which engineering and work practice controls are not feasible;

(iii) In work situations where feasible engineering and work practice controls are not yet sufficient to reduce exposure to or below the permissible exposure limits;

(iv) In operations specified under subsection (7)(a) of this section; and

(v) Whenever an employee requests a respirator.

(b) Respirator selection.

(i) Where respirators are required under this section, the employer shall select the appropriate respirator from Table I and shall assure that the employee uses the respirator provided.

TABLE I

Cotton dust concentration	Required respirator
Not greater than—	
(a) 5 x the applicable permissible exposure limit (PEL).	A disposable respirator with a particulate filter.
(b) 10 x the applicable PEL.	A quarter or half-mask respirator, other than a disposable respirator, equipped with particulate filters.
(c) 100 x the applicable PEL.	A full facepiece respirator equipped with high-efficiency particulate filters.
(d) Greater than 100 x the applicable PEL.	A powered air-purifying respirator equipped with high-efficiency particulate filters.

Notes

1. A disposable respirator means the filter element is an inseparable part of the respirator.
2. Any respirators permitted at higher environmental concentrations can be used at lower concentrations.
3. Self-contained breathing apparatus are not required respirators but are permitted respirators.
4. Supplied air respirators are not required but are permitted under the following conditions: Cotton dust concentration not greater than 10X the PEL—Any supplied air respirator; not greater than 100X the PEL—Any supplied air respirator with full facepiece, helmet or hood; greater than 100X the PEL—A supplied air respirator operated in positive pressure mode.

(ii) The employer shall select respirators from those tested and approved for protection against dust by the National Institute for Occupational Safety and Health (NIOSH) under the provisions of 30 CFR Part 11.

(iii) Whenever respirators are required by this section for concentrations not greater than 100 x the applicable permissible exposure limit, the employer shall, upon the request of the employee, provide a powered air purifying respirator with a high efficiency particulate filter in lieu of the respirator specified in paragraphs (a), (b), or (c) of Table I.

(iv) Whenever a physician determines that an employee who works in an area in which the dust level exceeds the PEL is unable to wear any form of respirator, including a powered air purifying respirator, the employee shall be given the opportunity to transfer to another position which is available or which later becomes available having a dust level at or below the PEL. The employer shall assure that an employee who is transferred from an area in which the dust level exceeds the PEL due to an inability to wear a respirator suffers no reduction in current wage rate or other benefits as a result of the transfer.

(c) Respirator program. The employer shall institute a respirator program in accordance with WAC 296-62-071.

(d) Respirator usage.

(i) The employer shall assure that the respirator used by each employee exhibits minimum face piece leakage and that the respirator is fitted properly.

(ii) The employer shall allow each employee who uses a filter respirator, to change the filter elements whenever an increase in breathing resistance is detected by the employee. The employer shall maintain an adequate supply of filter elements for this purpose.

(iii) The employer shall allow employees who wear respirators to wash their faces and respirator face pieces to prevent skin irritation associated with respirator use.

(7) Work practices. Each employer shall, regardless of the level of employee exposure, immediately establish and implement a written program of work practices which shall minimize cotton dust exposure. The following shall be included where applicable:

(a) Compressed air "blow down" cleaning shall be prohibited, where alternative means are feasible. Where compressed air is used for cleaning, the employees performing the "blow down" or "blow off" shall wear suitable respirators. Employees whose presence is not required to perform "blow down" or "blow off" shall be required to leave the area affected by the "blow down" or "blow off" during this cleaning operation.

(b) Cleaning of clothing or floors with compressed air shall be prohibited.

(c) Floor sweeping shall be performed with a vacuum or with methods designed to minimize dispersal of dust.

(d) In areas where employees are exposed to concentrations of cotton dust greater than the permissible exposure limit, cotton and cotton waste shall be stacked, sorted, baled, dumped, removed or otherwise handled by mechanical means, except where the employer can show that it is infeasible to do so. Where infeasible, the method used for handling cotton and cotton waste shall be the method which reduces exposure to the lowest level feasible.

(8) Medical surveillance.

(a) General.

(i) Each employer covered by the standard shall institute a program of medical surveillance for all employees exposed to cotton dust.

(ii) The employer shall assure that all medical examinations and procedures are performed by or under the supervision of a licensed physician and are provided without cost to the employee.

(iii) Persons other than licensed physicians, who administer the pulmonary function testing required by this section shall have completed a NIOSH approved training course in spirometry.

(b) Initial examinations. The employer shall provide medical surveillance to each employee who is or may be exposed to cotton dust. For new employees' this examination shall be provided prior to initial assignment. The medical surveillance shall include at least the following:

(i) A medical history;

(ii) The standardized questionnaire contained in WAC 296-62-14537; and

(iii) A pulmonary function measurement, including a determination of forced vital capacity (FVC) and forced expiratory volume in one second (FEV₁), the FEV₁/FVC ratio, and the percentage that the measured values of FEV₁ and FVC differ from the predicted values, using the standard tables in WAC 296-62-14539. These determinations shall be made for each employee before the employee enters the workplace on the first day of the work week, preceded by at least thirty-five hours of no exposure to cotton dust. The tests shall be repeated during the shift, no less than four hours and no more than ten hours after the beginning of the work shift; and, in any event, no more than one hour after

cessation of exposure. Such exposure shall be typical of the employee's usual workplace exposure. The predicted FEV₁ and FVC for blacks shall be multiplied by 0.85 to adjust for ethnic differences.

(iv) Based upon the questionnaire results, each employee shall be graded according to Schilling's byssinosis classification system.

(c) Periodic examinations.

(i) The employer shall provide at least annual medical surveillance for all employees exposed to cotton dust above the action level in yarn manufacturing, slashing and weaving, cotton washing and waste house operations. The employer shall provide medical surveillance at least every two years for all employees exposed to cotton dust at or below the action level, for all employees exposed to cotton dust from washed cotton (except from washed cotton defined in subsection (9)(c) of this section), and for all employees exposed to cotton dust in cottonseed processing and waste processing operations. Periodic medical surveillance shall include at least an update of the medical history, standardized questionnaire (Appendix B-111), Schilling byssinosis grade, and the pulmonary function measurements in (b)(iii) of this subsection.

(ii) Medical surveillance as required in (c)(i) of this subsection shall be provided every six months for all employees in the following categories:

(A) An FEV₁ of greater than eighty percent of the predicted value, but with an FEV₁ decrement of five percent or 200 ml. on a first working day;

(B) An FEV₁ of less than eighty percent of the predicted value; or

(C) Where, in the opinion of the physician, any significant change in questionnaire findings, pulmonary function results, or other diagnostic tests have occurred.

(iii) An employee whose FEV₁ is less than sixty percent of the predicted value shall be referred to a physician for a detailed pulmonary examination.

(iv) A comparison shall be made between the current examination results and those of previous examinations and a determination made by the physician as to whether there has been a significant change.

(d) Information provided to the physician. The employer shall provide the following information to the examining physician:

(i) A copy of this regulation and its appendices;

(ii) A description of the affected employee's duties as they relate to the employee's exposure;

(iii) The employee's exposure level or anticipated exposure level;

(iv) A description of any personal protective equipment used or to be used; and

(v) Information from previous medical examinations of the affected employee which is not readily available to the examining physician.

(e) Physician's written opinion.

(i) The employer shall obtain and furnish the employee with a copy of a written opinion from the examining physician containing the following:

(A) The results of the medical examination and tests including the FEV₁, FVC, and FEV₁/FVC ratio;

(B) The physician's opinion as to whether the employee has any detected medical conditions which would place the employee at increased risk of material impairment of the employee's health from exposure to cotton dust;

(C) The physician's recommended limitations upon the employee's exposure to cotton dust or upon the employee's use of respirators including a determination of whether an employee can wear a negative pressure respirator, and where the employee cannot, a determination of the employee's ability to wear a powered air purifying respirator; and

(D) A statement that the employee has been informed by the physician of the results of the medical examination and any medical conditions which require further examination or treatment.

(ii) The written opinion obtained by the employer shall not reveal specific findings or diagnoses unrelated to occupational exposure.

(9) Employee education and training.

(a) Training program.

(i) The employer shall provide a training program for all employees exposed to cotton dust and shall assure that each employee is informed of the following:

(A) The acute and long term health hazards associated with exposure to cotton dust;

(B) The names and descriptions of jobs and processes which could result in exposure to cotton dust at or above the PEL.

(C) The measures, including work practices required by subsection (7) of this section, necessary to protect the employee from exposures in excess of the permissible exposure limit;

(D) The purpose, proper use and limitations of respirators required by subsection (6) of this section;

(E) The purpose for and a description of the medical surveillance program required by subsection (8) of this section and other information which will aid exposed employees in understanding the hazards of cotton dust exposure; and

(F) The contents of this standard and its appendices.

(ii) The training program shall be provided prior to initial assignment and shall be repeated annually for each employee exposed to cotton dust, when job assignments or work processes change and when employee performance indicates a need for retraining.

(b) Access to training materials.

(i) Each employer shall post a copy of this section with its appendices in a public location at the workplace, and shall, upon request, make copies available to employees.

(ii) The employer shall provide all materials relating to the employee training and information program to the director upon request.

(10) Signs. The employer shall post the following warning sign in each work area where the permissible exposure limit for cotton dust is exceeded:

WARNING

COTTON DUST WORK AREA

MAY CAUSE ACUTE OR DELAYED LUNG INJURY
(BYSSINOSIS)

RESPIRATORS REQUIRED IN THIS AREA

(11) Recordkeeping.

(a) Exposure measurements.

(i) The employer shall establish and maintain an accurate record of all measurements required by subsection (4) of this section.

(ii) The record shall include:

(A) A log containing the items listed in WAC 296-62-14535 (4)(a), and the dates, number, duration, and results of each of the samples taken, including a description of the procedure used to determine representative employee exposures;

(B) The type of protective devices worn, if any, and length of time worn; and

(C) The names, social security number, job classifications, and exposure levels of employees whose exposure the measurement is intended to represent.

(iii) The employer shall maintain this record for at least twenty years.

(b) Medical surveillance.

(i) The employer shall establish and maintain an accurate medical record for each employee subject to medical surveillance required by subsection (8) of this section.

(ii) The record shall include:

(A) The name and social security number and description of the duties of the employee;

(B) A copy of the medical examination results including the medical history, questionnaire response, results of all tests, and the physician's recommendation;

(C) A copy of the physician's written opinion;

(D) Any employee medical complaints related to exposure to cotton dust;

(E) A copy of this standard and its appendices, except that the employer may keep one copy of the standard and the appendices for all employees, provided that he references the standard and appendices in the medical surveillance record of each employee; and

(F) A copy of the information provided to the physician as required by subsection (8)(d) of this section.

(iii) The employer shall maintain this record for at least twenty years.

(c) Availability.

(i) The employer shall make all records required to be maintained by subsection (11) of this section available to the director for examination and copying.

(ii) Employee exposure measurement records and employee medical records required by this subsection shall be provided upon request to employees, designated representatives, and the assistant director in accordance with WAC 296-62-05201 through 296-62-05209 and 296-62-05213 through 296-62-05217.

(d) Transfer of records.

(i) Whenever the employer ceases to do business, the successor employer shall receive and retain all records required to be maintained by subsection (11) of this section.

(ii) Whenever the employer ceases to do business, and there is no successor employer to receive and retain the records for the prescribed period, these records shall be transmitted to the director.

(iii) At the expiration of the retention period for the records required to be maintained by this section, the

employer shall notify the director at least three months prior to the disposal of such records and shall transmit those records to the director if he requests them within that period.

(iv) The employer shall also comply with any additional requirements involving transfer of records set forth in WAC 296-62-05215.

(12) Observation of monitoring.

(a) The employer shall provide affected employees or their designated representatives an opportunity to observe any measuring or monitoring of employee exposure to cotton dust conducted pursuant to subsection (4) of this section.

(b) Whenever observation of the measuring or monitoring of employee exposure to cotton dust requires entry into an area where the use of personal protective equipment is required, the employer shall provide the observer with and assure the use of such equipment and shall require the observer to comply with all other applicable safety and health procedures.

(c) Without interfering with the measurement, observers shall be entitled to:

(i) An explanation of the measurement procedures;

(ii) An opportunity to observe all steps related to the measurement of airborne concentrations of cotton dust performed at the place of exposure; and

(iii) An opportunity to record the results obtained.

(13) Effective date.

(a) General. This emergency rule is effective upon filing with the code reviser, except as otherwise provided below.

(b) Startup dates.

(i) Initial monitoring. The initial monitoring required by subsection (4)(b) of this section shall be completed as soon as possible but no later than September 27, 1980.

(ii) Methods of compliance;

(A) The engineering and work practice controls required by subsection (5) of this section shall be implemented no later than March 27, 1984 except as set forth in (13)(b)(ii)-(B) of this section.

(B) The engineering and work practice controls required by subsection (5) of this section shall be implemented no later than March 27, 1986, for ring spinning operations (including only ring spinning and winding, twisting, spooling, beaming and warping following ring spinning) where the operations meet the following criteria:

(I) The weight of the yarn being run is one hundred percent cotton and the average yarn count by weight is eighteen or below;

(II) The average weight of the yarn run is eighty percent or more cotton and the average yarn count by weight is sixteen or below; or

(III) The average weight of the yarn being run is fifty percent or more cotton and the average yarn count by weight is fourteen or below;

(C) When the provisions of (b)(ii)(B) of this subsection are being relied upon, the following definitions shall apply:

(I) The average cotton content shall be determined by dividing the total weight of cotton in the yarns being run by the total weight of all the yarns being run in the relevant work area.

(II) The average yarn count shall be determined by multiplying the yarn count times the pounds of each particu-

lar yarn being run to get the "total hank" for each of the yarns being run in the relevant area. The "total hank" values for all of the yarns being run should then be summed and divided by the total pounds of yarn being run, to produce the average yarn count number for all the yarns being run in the relevant work area.

(D) Where the provisions of (b)(ii)(B) of this subsection are being relied upon, the employer shall update the employer's compliance plan no later than February 13, 1986, to indicate the steps being taken to reduce cotton dust levels to 200 $\mu\text{g}/\text{m}^3$ through the use of engineering and work practice controls by March 27, 1986.

(E) Where the provisions of (b)(ii)(B) of this subsection are being relied upon, the employer shall maintain airborne concentrations of cotton dust below 1000 $\mu\text{g}/\text{m}^3$ mean concentration averaged over an eight-hour period measured by a vertical elutriator or an equivalent instrument with engineering and work practice controls and shall maintain the permissible exposure limit specified by subsection (3)(a)(i) of this section with any combination of engineering controls, work practice controls and respirators.

(iii) Compliance program. The compliance program required by subsection (5)(c) of this section shall be established no later than March 27, 1981.

(iv) Respirators. The respirators required by subsection (6) of this section shall be provided no later than April 27, 1980.

(v) Work practices. The work practices required by subsection (7) of this section shall be implemented no later than June 27, 1980.

(vi) Medical surveillance. The medical surveillance required by subsection (8) of this section shall be completed no later than March 27, 1981 for the textile industry and no later than June 13, 1986 for the cotton seed processing and waste processing industry.

(vii) Employee education and training. The initial education and training required by subsection (9) of this section shall be completed as soon as possible but no later than June 27, 1980.

(14) Washed cotton.

(a) Exemptions. Cotton, after it has been washed by the processes described in this section is exempt from all or parts of this section as specified if the requirements of this section are met.

(b) Initial requirements.

(i) In order for an employer to qualify as exempt or partially exempt from this standard for operations using washed cotton, the employer must demonstrate that the cotton was washed in a facility which is open to inspection by the director and the employer must provide sufficient accurate documentary evidence to demonstrate that the washing methods utilized meet the requirements of this section.

(ii) An employer who handles or processes cotton which has been washed in a facility not under the employer's control and claims an exemption or partial exemption under this paragraph, must obtain from the cotton washer and make available at the worksite, to the director, or his designated representative, to any affected employee, or to their designated representative the following:

(A) A certification by the washer of the cotton of the grade of cotton, the type of washing process, and that the batch meets the requirements of this section:

(B) Sufficient accurate documentation by the washer of the cotton grades and washing process; and

(C) An authorization by the washer that the director may inspect the washer's washing facilities and documentation of the process.

(c) Medical and dyed cotton. Medical grade (USP) cotton, cotton that has been scoured, bleached and dyed, and mercerized yarn shall be exempt from all provisions of this standard.

(d) Higher grade washed cotton. The handling or processing of cotton classed as "low middling light spotted or better" which has been washed:

(i) On a continuous batt system or a rayon rinse system.

(ii) With water,

(iii) At a temperature of no less than 60°C,

(iv) With a water-to-fiber ratio of no less than 40:1, and

(v) With bacterial levels in the wash water controlled to limit bacterial contamination of the cotton, shall be exempt from all provisions of the standard except the requirements of subsection (8) Medical surveillance, subsection (11)(b) Medical surveillance, subsection (11)(c) Availability, subsection (11)(d) Transfer of records, and Appendices B, C, and D of this section.

(e) Lower grade washed cotton. The handling and processing of cotton of grades lower than "low middling light spotted," that has been washed as specified in (d) of this subsection and has also been bleached, shall be exempt from all provisions of the standard except the requirements of subsection (3)(a) Permissible exposure limits, subsection (4) Exposure monitoring and measurement, subsection (8) Medical surveillance, subsection (11) Recordkeeping, and Appendices B, C and D of this section.

(f) Mixed grades of washed cotton. If more than one grade of washed cotton is being handled or processed together, the requirements of the grade with the most stringent exposure limit, medical and monitoring requirements shall be followed.

(15) Appendices.

(a) Appendix B (B-I, B-II and B-III), WAC 296-62-14537, Appendix C, WAC 296-62-14539 and Appendix D, WAC 296-62-14541 are incorporated as part of this chapter and the contents of these appendices are mandatory.

(b) Appendix A of this chapter, WAC 296-62-14535 contains information which is not intended to create any additional obligations not otherwise imposed or to detract from any existing obligations.

(c) Appendix E of this chapter is a protocol which may be followed in the validation of alternative measuring devices as equivalent to the vertical elutriator cotton dust sampler. Other protocols may be used if it is demonstrated that they are statistically valid, meet the requirements in subsection (4)(a)(iii) of this section, and are appropriate for demonstrating equivalency.

[Statutory Authority: Chapter 49.17 RCW. 87-24-051 (Order 87-24), § 296-62-14533, filed 11/30/87. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-16-009 (Order 86-28), § 296-62-14533, filed 7/25/86; 82-03-023 (Order 82-1), § 296-62-14533, filed 1/15/82. Statutory Authority: 49.17.040, 49.17.050, and 49.17.240. 81-16-015 (Order 81-20), § 296-62-

14533, filed 7/27/81. Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 42.30 and 43.22 RCW. 80-17-014 (Order 80-20), § 296-62-14533, filed 11/13/80.]

WAC 296-62-14535 Appendix A—Air sampling and analytical procedures for determining concentrations of cotton dust. (1) Sampling locations. The sampling procedures must be designed so that samples of the actual dust concentrations are collected accurately and consistently and reflect the concentrations of dust at the place and time of sampling. Sufficient number of six-hour area samples in each distinct work area of the plant should be collected at locations which provide representative samples of air to which the worker is exposed. In order to avoid filter overloading, sampling time may be shortened when sampling in dusty areas. Samples in each work area should be gathered simultaneously or sequentially during a normal operating period. The daily time-weighted average (TWA) exposure of each worker can then be determined by using the following formula:

$$\frac{\text{Summation of hours spent in each location and the dust concentration in that location.}}{\text{Total hours exposed}}$$

A time-weighted average concentration should be computed for each worker and properly logged and maintained on file for review.

(2) Sampling equipment.

(a) Sampler. The instrument selected for monitoring is the Lumsden-Lynch vertical elutriator. It should operate at a flow rate of 7.4 ± 0.2 liters/minute. The samplers should be cleaned prior to sampling. The pumps should be monitored during sampling.

(b) Filter holder. A three-piece cassette constructed of polystyrene designed to hold a 37-mm diameter filter should be used. Care must be exercised to insure that an adequate seal exists between elements of the cassette.

(c) Filters and support pads. The membrane filters used should be polyvinyl chloride with a 5-um pore size and 37-mm diameter. A support pad, commonly called a backup pad, should be used under the filter membrane in the field monitor cassette.

(d) Balance. A balance sensitive to 10 micrograms should be used.

(3) Instrument calibration procedure. Samplers shall be calibrated when first received from the factory, after repair, and after receiving any abuse. The samplers should be calibrated in the laboratory both before they are used in the field and after they have been used to collect a large number of field samples. The primary standard, such as a spirometer or other standard calibrating instruments such as a wet test meter or a large bubble meter or dry gas meter, should be used. Instructions for calibration with the wet test meter follow. If another calibration device is selected, equivalent procedures should be used:

(a) Level wet test meter. Check the water level which should just touch the calibration point at the left side of the meter. If water level is low, add water 1-2° F. warmer than room temperature of till point. Run the meter for thirty minutes before calibration;

(b) Place the polyvinyl chloride membrane filter in the filter cassette;

(c) Assemble the calibration sampling train;

(d) Connect the wet test meter to the train.

The pointer on the meter should run clockwise and a pressure drop of not more than 1.0 inch of water indicated. If the pressure drop is greater than 1.0, disconnect and check the system;

(e) Operate the system for ten minutes before starting the calibration;

(f) Check the vacuum gauge on the pump to insure that the pressure drop across the orifice exceeds seventeen inches of mercury;

(g) Record the following on calibration data sheets:

(i) Wet test meter reading, start and finish;

(ii) Elapsed time, start and finish (at least two minutes);

(iii) Pressure drop at manometer;

(iv) Air temperature;

(v) Barometric pressure; and

(vi) Limiting orifice number.

(h) Calculate the flow rate and compare against the flow of 7.4 ± 0.2 liters/minute. If flow is between these limits, perform calibration again, average results, and record orifice number and flow rate. If flow is not within these limits, discard or modify orifice and repeat procedure;

(i) Record the name of the person performing the calibration, the date, serial number of the wet test meter, and the number of the critical orifices being calibrated.

(4) Sampling procedure.

(a) Sampling data sheets should include a log of:

(i) The date of the sample collection;

(ii) The time of sampling;

(iii) The location of the sampler;

(iv) The sampler serial number;

(v) The cassette number;

(vi) The time of starting and stopping the sampling and the duration of sampling;

(vii) The weight of the filter before and after sampling;

(viii) The weight of dust collected (corrected for controls);

(ix) The dust concentration measured;

(x) Other pertinent information; and

(xi) Name of person taking sample.

(b) Assembly of filter cassette should be as follows:

(i) Loosely assemble three-piece cassette;

(ii) Number cassette;

(iii) Place absorbent pad in cassette;

(iv) Weigh filter to an accuracy of 10 µg;

(v) Place filter in cassette;

(vi) Record weight of filter in log, using cassette number for identification;

(vii) Fully assemble cassette, using pressure to force parts tightly together;

(viii) Install plugs top and bottom;

(ix) Put shrink band on cassette, covering joint between center and bottom parts of cassette; and

(x) Set cassette aside until shrink band dries thoroughly.

(c) Sampling collection should be performed as follows:

(i) Clean lint out of the motor and elutriator;

(ii) Install vertical elutriator in sampling locations specified above with inlet 4-1/2 to 5-1/2 feet from floor (breathing zone height);

(iii) Remove top section of cassette;

(iv) Install cassette in ferrule of elutriator;

(v) Tape cassette to ferrule with masking tape or similar material for air-tight seal;

(vi) Remove bottom plug of cassette and attach hose containing critical orifice;

(vii) Start elutriator pump and check to see if gauge reads above 17 in. of Hg vacuum;

(viii) Record starting time, cassette number, and sampler number;

(ix) At end of sampling period stop pump and record time; and

(x) Controls with each batch of samples collected, two additional filter cassettes should be subjected to exactly the same handling as the samples, except that they are not opened. These control filters should be weighed in the same manner as the sample filters.

Any difference in weight in the control filters would indicate that the procedure for handling sample filters may not be adequate and should be evaluated to ascertain the cause of the difference, whether and what necessary corrections must be made, and whether additional samples must be collected.

(d) Shipping. The cassette with samples should be

collected, along with the appropriate number of blanks, and shipped to the analytical laboratory in a suitable container to prevent damage in transit.

(e) Weighing of the sample should be achieved as follows:

(i) Remove shrink band;

(ii) Remove top and middle sections of cassette and bottom plug;

(iii) Remove filter from cassette and weigh to an accuracy of 10 μg ; and

(iv) Record weight in log against original weight.

(f) Calculation of volume of air sampled should be determined as follows:

(i) From starting and stopping times of sampling period, determine length of time in minutes of sampling period; and

(ii) Multiply sampling time in minutes by flow rate of critical orifice in liters per minute and divide by 1000 to find air quantity in cubic meters.

(g) Calculation of dust concentrations should be made as follows:

(i) Subtract weight of clean filter from dirty filter and apply control correction to find actual weight of sample. Record this weight (in μg) in log; and

(ii) Divide mass of sample in μg by air volume in cubic meters to find dust concentration in $\mu\text{g}/\text{m}$. Record in log.

[Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 42.30 and 43.22 RCW. 80-17-014 (Order 80-20), § 296-62-14535, filed 11/13/80.]

WAC 296-62-14537 Appendix B-I through B-III—Respiratory questionnaire.

APPENDIX B-I

Respiratory Questionnaire

A. IDENTIFICATION DATA

PLANT _____ SOCIAL SECURITY NO. _____
DAY MONTH YEAR
(figures) (last 2 digits)

NAME _____ DATE OF INTERVIEW _____
(Surname)

(First Names) DATE OF BIRTH _____
M F

ADDRESS _____ AGE _____ (8,9) SEX _____ (10)
 RACE W N IND. OTHER _____ (11)

INTERVIEWER: 1 2 3 4 5 6 7 8 (12)

WORK SHIFT: 1st _____ 2nd _____ 3rd _____ (13) STANDING HEIGHT _____ (14,15)

PRESENT WORK AREA _____ WEIGHT _____ (16,18)

If working in more than one specified work area, X area where most of the work shift is spent. If "other," but spending 25% of the work shift in one of the specified work areas, classify in that work area. If carding department employee, check area within that department where most of the work shift is spent (if in doubt, check "throughout"). For work areas such as spinning and weaving where many work rooms may be involved, be sure to check the specific work room to which employee is assigned — if he works in more than one work room within a department classify as 7 (all) for that department.

	Workroom Number	(19) Open	(20) Pick	(21) Cards	(22) #1	(23) #2	(24) Spin	(25) Wind	(26) Twist	(27) Spool	(28) Warp	(29) Slash	(30) Weave	Other
AT RISK (cotton & cotton blend)	1			Cards										
	2			Draw										
	3			Comb										
	4			Rove										
	5			Thru Out										
	6													
	7 (all)													
Control (synthetic & wool)	8													
Ex-Worker (cotton)	9													

Use actual wording of each question. Put X in appropriate square after each question. When in doubt record 'No'.
When no square, circle appropriate answer.

B. COUGH

(on getting up) †
Do you usually cough first thing in the morning? _____ Yes _____ No _____ (31)
(Count a cough with first smoke or on "first going out of doors."
Exclude clearing throat or a single cough.)

Do you usually cough during the day or at night? _____ Yes _____ No _____ (32)
(Ignore an occasional cough.)

If 'Yes' to either question (31-32):

Do you cough like this on most days for as much as three months a year? _____ Yes _____ No _____ (33)

Do you cough on any particular day of the week? _____ Yes _____ No _____ (34)

(1) (2) (3) (4) (5) (6) (7) _____

If 'Yes': Which day? Mon. Tues. Wed. Thurs. Fri. Sat. Sun. _____ (35)

C. PHLEGM or alternative word to suit local custom.

(on getting up) †
Do you usually bring up any phlegm from your chest first thing in the morning? (Count phlegm with the first smoke or on "first going out of doors." Exclude phlegm from the nose. Count swallowed phlegm.) _____ Yes _____ No _____ (36)

Do you usually bring up any phlegm from your chest during the day or at night? (Accept twice or more.) _____ Yes _____ No _____ (37)

If 'Yes' to either question (36) or (37):

Do you bring up phlegm like this on most days for as much as three months each year? _____ Yes _____ No _____ (38)

If 'Yes' to question (33) or (38):

How long have you had this phlegm? (cough)
(Write in number of years)

(1) 2 years or less
(2) More than 2 years-9 years
(3) 10-19 years
(4) 20+ years

†These words are for subjects who work at night

D. CHEST ILLNESSES

In the past three years, have you had a period of (increased) cough and phlegm lasting for 3 weeks or more? _____ (1) No _____ (40)
_____ (2) Yes, only one period
_____ (3) Yes, two or more periods

†For subjects who usually have phlegm

During the past 3 years have you had any chest illness which has kept you off work, indoors at home or in bed? (For as long as one week, flu?) _____ Yes _____ No _____ (41)

If 'Yes' to (41): Did you bring up (more) phlegm than usual in any of these illnesses? _____ Yes _____ No _____ (42)

If 'Yes' to (42): During the past three years have you had:
Only one such illness with increased phlegm? _____ (1) _____ (43)

More than one such illness: _____ (2) _____ (44)

Br. Grade _____

E. TIGHTNESS

Does your chest ever feel tight or your breathing become difficult? _____ Yes _____ No _____ (45)

Is your chest tight or your breathing difficult on any particular day of the week? (after a week or 10 days away from the mill) _____ Yes _____ No _____ (46)

If 'Yes': Which day? Mon. (1) Sometimes (3) Tues. (4) Wed. (5) Thur. (6) Fri. (7) Sat. (8) Sun. (47) Always (2)

If 'Yes' Monday: At what time on Monday does your chest feel tight or your breathing difficult? 1 Before entering the mill (48) 2 After entering the mill

(Ask only if NO to Question (45).)

In the past, has your chest ever been tight or your breathing difficult on any particular day of the week? _____ Yes _____ No _____ (49)

If 'Yes': Which day? Mon. (1) Sometimes (3) Tues. (4) Wed. (5) Thur. (6) Fri. (7) Sat. (8) Sun. (50) Always (2)

F. BREATHLESSNESS

If disabled from walking by any condition other than heart or lung disease put "X" here and leave questions (52-60) unasked. (51)

Are you ever troubled by shortness of breath, when hurrying on the level or walking up a slight hill? _____ Yes _____ No _____ (52)

If 'No', grade is 1. If 'Yes' proceed to next question

Do you get short of breath walking with other people at an ordinary pace on the level? _____ Yes _____ No _____ (53)

If 'No', grade is 2. If 'Yes', proceed to next question

Do you have to stop for breath when walking at your own pace on the level? _____ Yes _____ No _____ (54)

If 'No', grade is 3. If 'Yes', proceed to next question

Are you short of breath on washing or dressing? _____ Yes _____ No _____ (55)

If 'No', grade is 4. If 'Yes', grade is 5.

Dyspnea Grd. _____ (56)

ON MONDAYS:

Are you ever troubled by shortness of breath, when hurrying on the level or walking up a slight hill? _____ Yes _____ No _____ (57)

If 'No', grade is 1. If 'Yes', proceed to next question

Do you get short of breath walking with other people at an ordinary pace on the level? _____ Yes _____ No _____ (58)

If 'No', grade is 2. If 'Yes', proceed to next question

Do you have to stop for breath when walking at your own pace on the level? _____ Yes _____ No _____ (59)

If 'No', grade is 3. If 'Yes', proceed to next question

Are you short of breath on washing or dressing? _____ Yes _____ No _____ (60)

If 'No', grade is 4. If 'Yes', grade is 5

B. Grd. _____ (61)

G. OTHER ILLNESSES AND ALLERGY HISTORY

Do you have a heart condition for which you are under a doctor's care? Yes _____ No _____ (62)

Have you ever had asthma? Yes _____ No _____ (63)

If 'Yes', did it begin: (1) Before age 30

(2) After age 30

If 'Yes' before 30: did you have asthma before ever going to work in a textile mill? Yes _____ No _____ (64)

Have you ever had hay fever or other allergies (other than above)? Yes _____ No _____ (65)

H. TOBACCO SMOKING*

Do you smoke?

Record 'Yes' if regular smoker up to one month ago. (Cigarettes, cigar or pipe) Yes _____ No _____ (66)

If 'No' to (63):

Have you ever smoked? (Cigarettes, cigar, pipe. Record 'No' if subject has never smoked as much as one cigarette a day, or 1 oz. of tobacco a month, for as long as one year.) Yes _____ No _____ (67)

If 'Yes' to (63) or (64); what have you smoked and for how many years? (Write in specific number of years in the appropriate square)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	
Years	(<5)	(5-9)	(10-14)	(15-19)	(20-24)	(25-29)	(30-34)	(35-39)	(>40)	
Cigarettes										(68)
Pipe										(69)
Cigars										(70)

If cigarettes, how many packs per day? (Write in number of cigarettes)

- (1) less than 1/2 pack (71)
- (2) 1/2 pack, but less than 1 pack
- (3) 1 pack, but less than 1-1/2 packs
- (4) 1-1/2 packs or more

Number of pack years: _____ (72,73)

If an ex-smoker (cigarettes, cigar or pipe), how long since you stopped? (Write in number of years) _____ (74)

- (1) 0-1 year
- (2) 1-4 years
- (3) 5-9 years
- (4) 10+ years

*Have you changed your smoking habits since last interview? If yes, specify what changes.

L. OCCUPATIONAL HISTORY**

Have you ever worked in: A foundry? (As long as one year) Yes _____ No _____ (75)

Stone or mineral mining, quarrying or processing? (As long as one year) Yes _____ No _____ (76)

Asbestos milling or processing? (Ever) Yes _____ No _____ (77)

Other dusts, fumes or smoke? If yes, specify: Yes _____ No _____ (78)

Type of exposure _____

Length of exposure _____

**Ask only on first interview.

At what age did you first go to work in a textile mill? (Write in specific age in appropriate square).

(1)	(2)	(3)	(4)	(5)	(6)	
<20	20-24	25-29	30-34	35-39	40+	
						(79)

When you first worked in a textile mill, did you work with (1) Cotton or cotton blend (80)
 (2) Synthetic or wool

APPENDIX B-II

Respiratory Questionnaire for Nontextile Workers for the Cotton Industry

Identification No.	Interviewer Code
--------------------	------------------

Location	Date of Interview
----------	-------------------

A. IDENTIFICATION

1. NAME (Last) (First) (Middle Initial)		3. PHONE NUMBER AREA CODE () NO.	4. SOCIAL SECURITY # (optional see below) <input type="text"/>
2. CURRENT ADDRESS (Number, Street, or Rural Route, City or Town, County, State, Zip Code)		5. BIRTHDATE (Mo., Day, Yr.)	6. AGE LAST BIRTHDAY
		7. SEX 1 <input type="checkbox"/> Male 2 <input type="checkbox"/> Female	
		8. ETHNIC GROUP OR ANCESTRY 1. <input type="checkbox"/> White, not of Hispanic Origin 2. <input type="checkbox"/> Black, not of Hispanic Origin 3. <input type="checkbox"/> Hispanic 4. <input type="checkbox"/> American Indian or Alaskan Native 5. <input type="checkbox"/> Asian or Pacific Islander 6. <input type="checkbox"/> Other: _____	
9. STANDING HEIGHT _____ (cm)	10. WEIGHT _____	11. WORK SHIFT 1st <input type="checkbox"/> 2nd <input type="checkbox"/> 3rd <input type="checkbox"/>	

12. PRESENT WORK AREA

Please indicate primary assigned work area and percent of time spent at that site. If at other locations, please indicate and note percent of time for each.

PRIMARY WORK AREA	
SPECIFIC JOB	

13. APPROPRIATE INDUSTRY

- | | | |
|--|---|--|
| 1 <input type="checkbox"/> Garnetting | 3 <input type="checkbox"/> Cotton Warehouse | 5 <input type="checkbox"/> Cotton Classification |
| 2 <input type="checkbox"/> Cottonseed Oil Mill | 4 <input type="checkbox"/> Utilization | 6 <input type="checkbox"/> Cotton Ginning |

(Furnishing your Social Security number is voluntary. Your refusal to provide this number will not affect any right, benefit, or privilege to which you would be entitled if you did provide your Social Security number. Your Social Security number is being requested since it will permit use in future determinations in statistical research studies.)

C. SYMPTOMS

Use actual wording of each question. Put X in appropriate square after each question. When in doubt record "No".

COUGH

1. Do you usually cough first thing in the morning?
(on getting up)*
(Count a cough with first smoke or on
"first going out of doors". Exclude
clearing throat or a single cough.) 1 Yes 2 No
2. Do you usually cough during the day or at night?
(Ignore an occasional cough.) 1 Yes 2 No

If YES to either question 1 or 2:

3. Do you cough like this on most days for as much as
three months a year? 1 Yes 2 No 9 NA
4. Do you cough on any particular day of the week? 1 Yes 2 No

If YES:

5. Which day? Mon. Tue. Wed. Thur. Fri. Sat. Sun. _____

PHLEGM

6. Do you usually bring up any phlegm from your
chest first thing in the morning? (on getting
up)* (Count phlegm with the first smoke or on
"first going out of doors." Exclude phlegm
from the nose. Count swallowed phlegm.) 1 Yes 2 No
7. Do you usually bring up any phlegm from your
chest during the day or at night?
(Accept twice or more.) 1 Yes 2 No

If YES to either question 6 or 7:

8. Do you bring up phlegm like this on most days
for as much as three months each year? 1 Yes 2 No

If YES to question 3 or 8:

9. How long have you had this phlegm? (cough)
(Write in number of years)
- (1) 2 years or less
(2) More than 2 years - 9 years
(3) 10-19 years
(4) 20+ years

*These words are for subjects who work at night

CHEST ILLNESS

10. In the past three years, have you had a period of (increased) cough and phlegm lasting for 3 weeks or more? (1) No
 (2) Yes, only one period
 (3) Yes, two or more periods

For subjects who usually have phlegm:

11. During the past 3 years have you had any chest illness which has kept you off work, indoors at home or in bed? (For as long as one week, flu?) 1 Yes 2 No

If YES to 11:

12. Did you bring up (more) phelgm than usual in any of these illnesses? 1 Yes 2 No

If YES to 12: During the past three years have you had:

13. Only one such illness with increased phelgm? 1 Yes 2 No

14. More than one such illness: 1 Yes 2 No

Br. Brade _____

TIGHTNESS

15. Does your chest ever feel tight or your breathing become difficult? 1 Yes 2 No

16. Is your chest tight or your breathing difficult on any particular day of the week? (after a week or 10 days away from the mill) 1 Yes 2 No

17. If YES, Which day? Mon. (1) Sometimes (3) Tues. (2) Always (4) Wed. (5) Thur. (6) Fri. (7) Sat. (8) Sun.

18. If YES Monday: At what time on Monday does your chest feel tight or your breathing difficult? Before entering mill
 After entering mill

(ASK ONLY IF NO TO QUESTION 15)

19. In the past, has your chest ever been tight or your breathing difficult on any particular day of the week? 1 Yes 2 No

20. If YES, Which day? Mon. (1) Sometimes (3) Tues. (2) Always (4) Wed. (5) Thur. (6) Fri. (7) Sat. (8) Sun.

BREATHLESSNESS

21. If disabled from walking by any condition other than heart or lung disease put "X" in the space and leave questions (22-30) unasked.
22. Are you ever troubled by shortness of breath, when hurrying on the level or walking up a slight hill? 1 Yes 2 No

If NO, grade is 1. If YES, proceed to next question

23. Do you get short of breath walking with other people at an ordinary pace on the level? 1 Yes 2 No

If NO, grade is 2. If YES, proceed to next question

24. Do you have to stop for breath when walking at your own pace on the level? 1 Yes 2 No

If NO, grade is 3. If YES, proceed to next question

25. Are you short of breath on washing or dressing? 1 Yes 2 No

If NO, grade is 4. If YES, grade is 5.

26. Dyspnea Grd. _____

ON MONDAYS:

27. Are you ever troubled by shortness of breath, when hurrying on the level or walking up a slight hill? 1 Yes 2 No

If NO, grade is 1. If YES, proceed to next question

28. Do you get short of breath walking with other people at an ordinary pace on the level? 1 Yes 2 No

If NO, grade is 2, If YES, proceed to next question

29. Do you have to stop for breath when walking at your own pace on the level? 1 Yes 2 No

If NO, grade is 3. If YES, proceed to next question

30. Are you short of breath on washing or dressing? 1 Yes 2 No

If NO, grade is 4. If YES, grade is 5

31. B. Grd. _____

OTHER ILLNESSES AND ALLERGY HISTORY

32. Do you have a heart condition for which you are under a doctor's care? 1 Yes 2 No

OCCUPATIONAL HISTORY

Have you ever worked in:

44. A foundry? (As long as one year) 1 Yes 2 No
45. Stone or mineral mining, quarrying or
processing? (As long as one year) 1 Yes 2 No
46. Asbestos milling or processing? (Ever) 1 Yes 2 No
47. Cotton or cotton blend mill? (For controls only) 1 Yes 2 No
48. Other dusts, fumes or smoke? If yes, specify. 1 Yes 2 No

Type of exposure _____

Length of exposure _____

APPENDIX B III

Abbreviated Respiratory Questionnaire

A. IDENTIFICATION DATA

PLANT _____ SOCIAL SECURITY NO. _____
DAY MONTH YEAR
(figures) (last 2 digits)

NAME _____ DATE OF INTERVIEW _____
(Surname)

_____ DATE OF BIRTH _____
(First Names) M P

ADDRESS _____ AGE _____ (18,9) SEX _____ (10)

RACE W N IND OTHER (11)

INTERVIEWER: 1 2 3 4 5 6 7 8 (12)

WORK SHIFT: 1st _____ 2nd _____ 3rd _____ (13) STANDING HEIGHT _____ (14,15)

PRESENT WORK AREA _____ WEIGHT _____ (16,18)

If working in more than one specified work area, X area where most of the work shift is spent. If "other," but spending 25% of the work shift in one of the specified work areas, classify in that work area. If carding department employee, check area within that department where most of the work shift is spent (if in doubt, check "throughout"). For work areas such as spinning and weaving where many work rooms may be involved, be sure to check the specific work room to which employee is assigned — if he works in more than one work room within a department classify as 7 (all) for that department.

	Workroom Number	(19)	(20)	(21)	(22)	(23)	(24)	(25)	(26)	(27)	(28)	(29)	(30)
		Open	Pick	Arms	Card #1	#2	Spin	Wind	Twist	Spool	Warp	Slash	Weave	Other
AT RISK (cotton & cotton blend)	1			Cards									
	2			Draw									
	3			Comb									
	4			Rove									
	5			Thru Out									
	6												
	7 (all)												
Control (synthetic & wool)	8												
Ex-Worker (cotton)	9												

Use actual wording of each question. Put X in appropriate square after each question. When in doubt record "No." When no square, circle appropriate answer.

B. COUGH

(on getting up)†
Do you usually cough first thing in the morning? Yes No (31)
(Count a cough with first smoke or on "first going out of doors." Exclude clearing throat or a single cough.)

Do you usually cough during the day or at night? Yes No (32)
(Ignore an occasional cough.)

If 'Yes' to either question (31-32):

Do you cough like this on most days for as much as three months a year? Yes No (33)

Do you cough on any particular day of the week? Yes No (34)

(1) (2) (3) (4) (5) (6) (7)

If 'Yes' Which day? Mon. Tues. Wed. Thur. Fri. Sat Sun. (35)

C. PHLEGM or alternative word to suit local custom.

(on getting up)†
Do you usually bring up any phlegm from your chest first thing in the morning? Yes No (36)
(Count phlegm with the first smoke or on "first going out of doors." Exclude phlegm from the nose. Count swallowed phlegm.)

Do you usually bring up any phlegm from your chest during the day or at night? (Accept twice or more.) Yes No (37)

If 'Yes' to either question (36) or (37):

Do you bring up phlegm like this on most days for as much as three months each year? Yes No (38)

If 'Yes' to question (33) or (38):

- (cough)
How long have you had this phlegm? (Write in number of years)
(1) [] 2 years or less
(2) [] More than 2 years-9 years
(3) [] 10-19 years
(4) [] 20+ years

†These words are for subjects who work at night

D. TIGHTNESS

Does your chest ever feel tight or your breathing become difficult? Yes No (39)

Is your chest tight or your breathing difficult on any particular day of the week? (after a week or 10 days away from the mill) Yes No (40)

If 'Yes' Which day? Mon. Tues. Wed. Thur. Fri. Sat. Sun. (41)
(1) Sometimes (2) Always

If 'Yes' Monday: At what time on Monday does your chest feel tight or your breathing difficult?
1 [] Before entering the mill (42)
2 [] After entering the mill

(Ask only if NO to Question (45)*)

In the past, has your chest ever been tight or your breathing difficult on any particular day of the week? Yes No (43)

If 'Yes' Which day? Mon. Tues. Wed. Thur. Fri. Sat. Sun. (44)
(1) Sometimes (2) Always

E. TOBACCO SMOKING*

*Have you changed your smoking habits since last interview? If yes specify what changes.

[Statutory Authority: Chapter 49.17 RCW. 87-24-051 (Order 87-24), § 296-62-14537, filed 11/30/87.]

WAC 296-62-14539 Appendix C—Spirometry prediction tables for normal males and females.

TABLE 1. PREDICTED FVC FOR MALES (KNUDSON, ET AL; AM REV RESPIR DIS, 1976, 113, 587.)

HT	17	19	21	23	25	27	29	31	33	35	37	39	41	43	45	47	49	51	53	55	57	59	61	63	65
60.0	3.44	3.59	3.75	3.91	3.72	3.66	3.61	3.55	3.49	3.43	3.37	3.32	3.26	3.20	3.14	3.08	3.03	2.97	2.91	2.85	2.79	2.74	2.68	2.62	2.56
60.5	3.50	3.66	3.81	3.97	3.80	3.75	3.69	3.63	3.57	3.51	3.45	3.40	3.34	3.28	3.22	3.17	3.11	3.05	2.99	2.93	2.88	2.82	2.76	2.70	2.64
61.0	3.56	3.72	3.88	4.03	3.89	3.83	3.77	3.71	3.66	3.60	3.54	3.48	3.42	3.37	3.31	3.25	3.19	3.13	3.08	3.02	2.96	2.90	2.84	2.79	2.73
61.5	3.63	3.78	3.94	4.10	3.97	3.91	3.85	3.80	3.74	3.68	3.62	3.56	3.51	3.45	3.39	3.33	3.27	3.22	3.16	3.10	3.04	2.98	2.93	2.87	2.81
62.0	3.69	3.85	4.00	4.16	4.05	3.99	3.94	3.88	3.82	3.76	3.70	3.65	3.59	3.53	3.47	3.41	3.36	3.30	3.24	3.18	3.12	3.07	3.01	2.95	2.89
62.5	3.76	3.91	4.07	4.22	4.13	4.08	4.02	3.96	3.90	3.84	3.79	3.73	3.67	3.61	3.55	3.50	3.44	3.38	3.32	3.26	3.21	3.15	3.09	3.03	2.97
63.0	3.82	3.97	4.13	4.29	4.22	4.16	4.10	4.04	3.99	3.93	3.87	3.81	3.75	3.70	3.64	3.58	3.52	3.46	3.41	3.35	3.29	3.23	3.17	3.12	3.06
63.5	3.88	4.04	4.19	4.35	4.30	4.24	4.18	4.13	4.07	4.01	3.95	3.89	3.84	3.78	3.72	3.66	3.60	3.55	3.49	3.43	3.37	3.31	3.26	3.20	3.14
64.0	3.95	4.10	4.26	4.41	4.30	4.22	4.21	4.15	4.09	4.03	3.98	3.92	3.86	3.80	3.74	3.69	3.63	3.57	3.51	3.45	3.40	3.34	3.28	3.22	3.16
64.5	4.01	4.17	4.32	4.48	4.46	4.41	4.35	4.29	4.23	4.17	4.12	4.06	4.00	3.94	3.88	3.83	3.77	3.71	3.65	3.59	3.54	3.48	3.42	3.36	3.30
65.0	4.07	4.23	4.39	4.54	4.55	4.49	4.43	4.37	4.32	4.26	4.20	4.14	4.08	4.03	3.97	3.91	3.85	3.79	3.74	3.68	3.62	3.56	3.50	3.45	3.39
65.5	4.14	4.29	4.45	4.60	4.63	4.57	4.51	4.46	4.40	4.34	4.28	4.22	4.17	4.11	4.05	3.99	3.93	3.88	3.82	3.76	3.70	3.64	3.59	3.53	3.47
66.0	4.20	4.36	4.51	4.67	4.71	4.65	4.60	4.54	4.48	4.42	4.36	4.31	4.25	4.19	4.13	4.07	4.02	3.96	3.90	3.84	3.78	3.73	3.67	3.61	3.55
66.5	4.26	4.42	4.58	4.73	4.80	4.74	4.68	4.62	4.56	4.51	4.45	4.39	4.33	4.27	4.22	4.16	4.10	4.04	3.98	3.93	3.87	3.81	3.75	3.69	3.64
67.0	4.33	4.48	4.64	4.80	4.86	4.82	4.76	4.70	4.65	4.59	4.53	4.47	4.41	4.36	4.30	4.24	4.18	4.12	4.07	4.01	3.95	3.89	3.83	3.78	3.72
67.5	4.39	4.55	4.70	4.86	4.90	4.84	4.79	4.73	4.67	4.61	4.55	4.50	4.44	4.38	4.32	4.26	4.21	4.15	4.09	4.03	3.97	3.92	3.86	3.80	3.74
68.0	4.45	4.61	4.77	4.92	5.04	4.98	4.93	4.87	4.81	4.75	4.69	4.64	4.58	4.52	4.46	4.40	4.35	4.29	4.23	4.17	4.11	4.06	4.00	3.94	3.88
68.5	4.52	4.67	4.83	4.99	5.13	5.07	5.01	4.95	4.89	4.84	4.78	4.72	4.66	4.60	4.55	4.49	4.43	4.37	4.31	4.26	4.20	4.14	4.08	4.02	3.97
69.0	4.58	4.74	4.89	5.05	5.21	5.15	5.09	5.03	4.98	4.92	4.86	4.80	4.74	4.69	4.63	4.57	4.51	4.45	4.40	4.34	4.28	4.22	4.16	4.11	4.05
69.5	4.64	4.80	4.96	5.11	5.29	5.23	5.17	5.12	5.06	5.00	4.94	4.88	4.83	4.77	4.71	4.65	4.59	4.54	4.48	4.42	4.36	4.30	4.25	4.19	4.13
70.0	4.71	4.86	5.02	5.18	5.37	5.32	5.26	5.20	5.14	5.08	5.02	4.97	4.91	4.85	4.79	4.74	4.68	4.62	4.56	4.50	4.44	4.39	4.33	4.27	4.21
70.5	4.77	4.93	5.08	5.24	5.46	5.40	5.34	5.28	5.22	5.17	5.11	5.05	4.99	4.93	4.88	4.82	4.76	4.70	4.64	4.59	4.53	4.47	4.41	4.35	4.30
71.0	4.83	4.99	5.15	5.30	5.54	5.48	5.42	5.36	5.31	5.25	5.19	5.13	5.07	5.02	4.96	4.90	4.84	4.78	4.73	4.67	4.61	4.55	4.49	4.44	4.38
71.5	4.90	5.05	5.21	5.37	5.62	5.56	5.50	5.45	5.39	5.33	5.27	5.21	5.16	5.10	5.04	4.98	4.92	4.87	4.81	4.75	4.69	4.64	4.58	4.52	4.46
72.0	4.96	5.12	5.27	5.43	5.70	5.65	5.59	5.53	5.47	5.41	5.36	5.30	5.24	5.18	5.12	5.07	5.01	4.95	4.89	4.83	4.78	4.72	4.66	4.60	4.54
72.5	5.03	5.18	5.34	5.49	5.79	5.73	5.67	5.61	5.55	5.50	5.44	5.38	5.32	5.26	5.21	5.15	5.09	5.03	4.97	4.92	4.86	4.80	4.74	4.68	4.63
73.0	5.09	5.24	5.40	5.56	5.87	5.81	5.75	5.69	5.64	5.58	5.52	5.46	5.40	5.35	5.29	5.23	5.17	5.11	5.06	5.00	4.94	4.88	4.82	4.77	4.71
73.5	5.15	5.31	5.46	5.62	5.95	5.89	5.83	5.78	5.72	5.66	5.60	5.54	5.49	5.43	5.37	5.31	5.25	5.20	5.14	5.08	5.02	4.96	4.91	4.85	4.79
74.0	5.22	5.37	5.53	5.68	6.03	5.98	5.92	5.86	5.80	5.74	5.69	5.63	5.57	5.51	5.45	5.40	5.34	5.28	5.22	5.16	5.11	5.05	4.99	4.93	4.87
74.5	5.28	5.44	5.59	5.75	6.12	6.06	6.00	5.94	5.88	5.83	5.77	5.71	5.65	5.59	5.54	5.48	5.42	5.36	5.30	5.25	5.19	5.13	5.07	5.01	4.96
75.0	5.34	5.50	5.65	5.81	6.20	6.14	6.08	6.02	5.97	5.91	5.85	5.79	5.73	5.68	5.62	5.56	5.50	5.44	5.39	5.33	5.27	5.21	5.15	5.10	5.04
75.5	5.41	5.56	5.72	5.87	6.28	6.22	6.17	6.11	6.05	5.99	5.93	5.88	5.82	5.76	5.70	5.64	5.59	5.53	5.47	5.41	5.35	5.30	5.24	5.18	5.12
76.0	5.47	5.63	5.78	5.94	6.36	6.31	6.25	6.19	6.13	6.07	6.02	5.96	5.90	5.84	5.78	5.73	5.67	5.61	5.55	5.49	5.44	5.38	5.32	5.26	5.20
76.5	5.53	5.69	5.85	6.00	6.45	6.39	6.33	6.27	6.21	6.16	6.10	6.04	5.98	5.92	5.87	5.81	5.75	5.69	5.63	5.58	5.52	5.46	5.40	5.34	5.29
77.0	5.60	5.75	5.91	6.06	6.53	6.47	6.41	6.35	6.30	6.24	6.18	6.12	6.06	6.01	5.95	5.89	5.83	5.77	5.72	5.66	5.60	5.54	5.48	5.43	5.37
77.5	5.66	5.82	5.97	6.13	6.61	6.55	6.50	6.44	6.38	6.32	6.26	6.21	6.15	6.09	6.03	5.97	5.92	5.86	5.80	5.74	5.68	5.63	5.57	5.51	5.45
78.0	5.72	5.88	6.04	6.19	6.69	6.64	6.58	6.52	6.46	6.40	6.35	6.29	6.23	6.17	6.11	6.06	6.00	5.94	5.88	5.82	5.77	5.71	5.65	5.59	5.53
78.5	5.79	5.94	6.10	6.26	6.78	6.72	6.66	6.60	6.54	6.49	6.43	6.37	6.31	6.25	6.20	6.14	6.08	6.02	5.96	5.91	5.85	5.79	5.73	5.67	5.62
79.0	5.85	6.01	6.16	6.32	6.86	6.80	6.74	6.68	6.63	6.57	6.51	6.45	6.39	6.34	6.28	6.22	6.16	6.10	6.05	5.99	5.93	5.87	5.81	5.76	5.70
79.5	5.91	6.07	6.23	6.38	6.94	6.88	6.83	6.77	6.71	6.65	6.59	6.54	6.48	6.42	6.36	6.30	6.25	6.19	6.13	6.07	6.01	5.96	5.90	5.84	5.78
80.0	5.98	6.13	6.29	6.45	7.02	6.97	6.91	6.85	6.79	6.73	6.68	6.62	6.56	6.50	6.44	6.39	6.33	6.27	6.21	6.15	6.10	6.04	5.98	5.92	5.86
80.5	6.04	6.20	6.35	6.51	7.11	7.05	6.99	6.93	6.87	6.82	6.76	6.70	6.64	6.58	6.53	6.47	6.41	6.35	6.29	6.24	6.18	6.12	6.06	6.00	5.95
81.0	6.10	6.26	6.42	6.57	7.19	7.13	7.07	7.02	6.96	6.90	6.84	6.78	6.73	6.67	6.61	6.55	6.49	6.44	6.38	6.32	6.26	6.20	6.15	6.09	6.03
81.5	6.17	6.32	6.48	6.64	7.27	7.21	7.16	7.10	7.04	6.98	6.92	6.87	6.81	6.75	6.69	6.63	6.58	6.52	6.46	6.40	6.34	6.29	6.23	6.17	6.11
82.0	6.23	6.39	6.54	6.70	7.35	7.30	7.24	7.18	7.12	7.06	7.01	6.95	6.89	6.83	6.77	6.72	6.66	6.60	6.54	6.48	6.43	6.37	6.31	6.25	6.19
82.5	6.30	6.45	6.61	6.76	7.44	7.38	7.32	7.26	7.20	7.15	7.09	7.03	6.97	6.91	6.86	6.80	6.74	6.68	6.62	6.57	6.51	6.45	6.39	6.33	6.28
83.0	6.36	6.51	6.67	6.83	7.52	7.46	7.40	7.35	7.29	7.23	7.17	7.11	7.06	7.00	6.94	6.88	6.82	6.77	6.71	6.65	6.59	6.53	6.48	6.42	6.36
83.5	6.42	6.58	6.73	6.89	7.60	7.54	7.49	7.43	7.37	7.31	7.25	7.20	7.14	7.08	7.02	6.96	6.91	6.85	6.79	6.73	6.67	6.62	6.56	6.50	6.44
84.0	6.49	6.64	6.80	6.95	7.68	7.63	7.57	7.51	7.45	7.39	7.34	7.28	7.22	7.16	7.10	7.05	6.99	6.93	6.87	6.81	6.76	6.70	6.64	6.58	6.52
84.5	6.55	6.71	6.86	7.02	7.77	7.71	7.65	7.59	7.53	7.48	7.42	7.36	7.30	7.24	7.19	7.13	7.07	7.01	6.95	6.90	6.84	6.78</			

TABLE 2. PREDICTED FEV1 FOR MALES (KNUDSON, ET AL: AM REV RESPIR DIS, 1976, 113, 587.)

HT	AGE																								
	17	19	21	23	25	27	29	31	33	35	37	39	41	43	45	47	49	51	53	55	57	59	61	63	65
60.0	2.97	3.06	3.15	3.24	3.05	2.99	2.94	2.88	2.83	2.78	2.72	2.67	2.61	2.56	2.51	2.45	2.40	2.34	2.29	2.24	2.18	2.13	2.07	2.02	1.97
60.5	3.03	3.12	3.21	3.30	3.11	3.06	3.00	2.95	2.90	2.84	2.79	2.73	2.68	2.63	2.57	2.52	2.46	2.41	2.36	2.30	2.25	2.19	2.14	2.09	2.03
61.0	3.08	3.17	3.26	3.35	3.16	3.12	3.07	3.02	2.96	2.91	2.85	2.80	2.75	2.69	2.64	2.58	2.53	2.48	2.42	2.37	2.31	2.26	2.21	2.15	2.10
61.5	3.14	3.23	3.32	3.41	3.24	3.19	3.14	3.08	3.03	2.97	2.92	2.87	2.81	2.76	2.70	2.65	2.60	2.54	2.49	2.43	2.38	2.33	2.27	2.22	2.16
62.0	3.20	3.29	3.38	3.47	3.31	3.26	3.20	3.15	3.09	3.04	2.99	2.93	2.88	2.82	2.77	2.72	2.66	2.61	2.55	2.50	2.45	2.39	2.34	2.28	2.23
62.5	3.26	3.35	3.44	3.53	3.38	3.32	3.27	3.22	3.16	3.11	3.05	3.00	2.95	2.89	2.84	2.78	2.73	2.68	2.62	2.57	2.51	2.46	2.41	2.35	2.30
63.0	3.32	3.41	3.50	3.59	3.44	3.39	3.34	3.28	3.23	3.17	3.12	3.07	3.01	2.96	2.90	2.85	2.80	2.74	2.69	2.63	2.58	2.53	2.47	2.42	2.36
63.5	3.38	3.47	3.56	3.65	3.51	3.46	3.40	3.35	3.29	3.24	3.19	3.13	3.08	3.02	2.97	2.92	2.86	2.81	2.75	2.70	2.65	2.59	2.54	2.48	2.43
64.0	3.43	3.52	3.61	3.70	3.58	3.52	3.47	3.41	3.36	3.31	3.25	3.20	3.14	3.09	3.04	2.98	2.93	2.87	2.82	2.77	2.71	2.66	2.60	2.55	2.50
64.5	3.49	3.58	3.67	3.76	3.64	3.59	3.53	3.48	3.43	3.37	3.32	3.26	3.21	3.16	3.10	3.05	2.99	2.94	2.89	2.83	2.78	2.72	2.67	2.62	2.56
65.0	3.55	3.64	3.73	3.82	3.71	3.65	3.60	3.55	3.49	3.44	3.38	3.33	3.28	3.22	3.17	3.11	3.06	3.01	2.95	2.90	2.84	2.79	2.74	2.68	2.63
65.5	3.61	3.70	3.79	3.88	3.77	3.72	3.67	3.61	3.56	3.50	3.45	3.40	3.34	3.29	3.23	3.18	3.13	3.07	3.02	2.96	2.91	2.86	2.80	2.75	2.69
66.0	3.67	3.76	3.85	3.94	3.84	3.79	3.73	3.68	3.62	3.57	3.52	3.46	3.41	3.35	3.30	3.25	3.19	3.14	3.08	3.03	2.98	2.92	2.87	2.81	2.76
66.5	3.73	3.82	3.91	4.00	3.91	3.85	3.80	3.74	3.69	3.64	3.58	3.53	3.47	3.42	3.37	3.31	3.26	3.20	3.15	3.10	3.04	2.99	2.93	2.88	2.83
67.0	3.79	3.88	3.97	4.06	3.97	3.92	3.86	3.81	3.76	3.70	3.65	3.59	3.54	3.49	3.43	3.38	3.32	3.27	3.22	3.16	3.11	3.05	3.00	2.95	2.89
67.5	3.84	3.93	4.02	4.11	4.04	3.98	3.93	3.88	3.82	3.77	3.71	3.66	3.61	3.55	3.50	3.44	3.39	3.34	3.28	3.23	3.17	3.12	3.07	3.01	2.96
68.0	3.90	3.99	4.08	4.17	4.10	4.05	4.00	3.94	3.89	3.83	3.78	3.73	3.67	3.62	3.56	3.51	3.46	3.40	3.35	3.29	3.24	3.19	3.13	3.08	3.02
68.5	3.96	4.05	4.14	4.23	4.17	4.12	4.06	4.01	3.95	3.90	3.85	3.79	3.74	3.68	3.63	3.58	3.52	3.47	3.41	3.36	3.31	3.25	3.20	3.14	3.09
69.0	4.02	4.11	4.20	4.29	4.24	4.18	4.13	4.07	4.02	3.97	3.91	3.86	3.80	3.75	3.70	3.64	3.59	3.53	3.48	3.43	3.37	3.32	3.26	3.21	3.16
69.5	4.08	4.17	4.26	4.35	4.30	4.25	4.19	4.14	4.09	4.03	3.98	3.92	3.87	3.82	3.76	3.71	3.65	3.60	3.55	3.49	3.44	3.38	3.33	3.28	3.22
70.0	4.14	4.23	4.32	4.41	4.37	4.31	4.26	4.21	4.15	4.10	4.04	3.99	3.94	3.88	3.83	3.77	3.72	3.67	3.61	3.56	3.50	3.45	3.40	3.34	3.29
70.5	4.19	4.28	4.37	4.46	4.43	4.38	4.33	4.27	4.22	4.16	4.11	4.06	4.00	3.95	3.89	3.84	3.79	3.73	3.68	3.62	3.57	3.52	3.46	3.41	3.35
71.0	4.25	4.34	4.43	4.52	4.50	4.45	4.39	4.34	4.28	4.23	4.18	4.12	4.07	4.01	3.96	3.91	3.85	3.80	3.74	3.69	3.64	3.58	3.53	3.47	3.42
71.5	4.31	4.40	4.49	4.58	4.57	4.51	4.46	4.40	4.35	4.30	4.24	4.19	4.13	4.08	4.03	3.97	3.92	3.86	3.81	3.76	3.70	3.65	3.59	3.54	3.49
72.0	4.37	4.46	4.55	4.64	4.63	4.58	4.52	4.47	4.42	4.36	4.31	4.25	4.20	4.15	4.09	4.04	3.98	3.93	3.88	3.82	3.77	3.71	3.66	3.61	3.55
72.5	4.43	4.52	4.61	4.70	4.70	4.64	4.59	4.54	4.48	4.43	4.37	4.32	4.27	4.21	4.16	4.10	4.05	4.00	3.94	3.89	3.83	3.78	3.73	3.67	3.62
73.0	4.49	4.58	4.67	4.76	4.76	4.71	4.66	4.60	4.55	4.49	4.44	4.39	4.33	4.28	4.22	4.17	4.12	4.06	4.01	3.95	3.90	3.85	3.79	3.74	3.68
73.5	4.54	4.63	4.72	4.81	4.83	4.78	4.72	4.67	4.61	4.56	4.51	4.45	4.40	4.34	4.29	4.24	4.18	4.13	4.07	4.02	3.97	3.91	3.86	3.80	3.75
74.0	4.60	4.69	4.78	4.87	4.90	4.84	4.79	4.73	4.68	4.63	4.57	4.52	4.46	4.41	4.36	4.30	4.25	4.19	4.14	4.09	4.03	3.98	3.92	3.87	3.82
74.5	4.66	4.75	4.84	4.93	4.96	4.91	4.85	4.80	4.75	4.69	4.64	4.58	4.53	4.48	4.42	4.37	4.31	4.26	4.21	4.15	4.10	4.04	3.99	3.94	3.88
75.0	4.72	4.81	4.90	4.99	5.03	4.97	4.92	4.87	4.81	4.76	4.70	4.65	4.60	4.54	4.49	4.43	4.38	4.33	4.27	4.22	4.16	4.11	4.06	4.00	3.95
75.5	4.78	4.87	4.96	5.05	5.09	5.04	4.99	4.93	4.88	4.82	4.77	4.72	4.66	4.61	4.55	4.50	4.45	4.39	4.34	4.28	4.23	4.18	4.12	4.07	4.01
76.0	4.84	4.93	5.02	5.11	5.16	5.11	5.05	5.00	4.94	4.89	4.84	4.78	4.73	4.67	4.62	4.57	4.51	4.46	4.40	4.35	4.30	4.24	4.19	4.13	4.08
76.5	4.90	4.99	5.08	5.17	5.23	5.17	5.12	5.06	5.01	4.96	4.90	4.85	4.79	4.74	4.69	4.63	4.58	4.52	4.47	4.42	4.36	4.31	4.25	4.20	4.15
77.0	4.95	5.04	5.13	5.22	5.29	5.24	5.18	5.13	5.08	5.02	4.97	4.91	4.86	4.81	4.75	4.70	4.64	4.59	4.54	4.48	4.43	4.37	4.32	4.27	4.21
77.5	5.01	5.10	5.19	5.28	5.36	5.30	5.25	5.20	5.14	5.09	5.03	4.98	4.93	4.87	4.82	4.76	4.71	4.66	4.60	4.55	4.49	4.44	4.39	4.33	4.28
78.0	5.07	5.16	5.25	5.34	5.42	5.37	5.32	5.26	5.21	5.15	5.10	5.05	4.99	4.94	4.88	4.83	4.78	4.72	4.67	4.61	4.56	4.51	4.45	4.40	4.34
78.5	5.13	5.22	5.31	5.40	5.49	5.44	5.38	5.33	5.27	5.22	5.17	5.11	5.06	5.00	4.95	4.90	4.84	4.79	4.73	4.68	4.63	4.57	4.52	4.46	4.41
79.0	5.19	5.28	5.37	5.46	5.56	5.50	5.45	5.39	5.34	5.29	5.23	5.18	5.12	5.07	5.02	4.96	4.91	4.85	4.80	4.75	4.69	4.64	4.58	4.53	4.48
79.5	5.25	5.34	5.43	5.52	5.62	5.57	5.51	5.46	5.41	5.35	5.30	5.24	5.19	5.14	5.08	5.03	4.97	4.92	4.87	4.81	4.76	4.70	4.65	4.60	4.54
80.0	5.30	5.39	5.48	5.57	5.69	5.63	5.58	5.53	5.47	5.42	5.36	5.31	5.26	5.20	5.15	5.09	5.04	4.99	4.93	4.88	4.82	4.77	4.72	4.66	4.61
80.5	5.36	5.45	5.54	5.63	5.75	5.70	5.65	5.59	5.54	5.48	5.43	5.38	5.32	5.27	5.21	5.16	5.11	5.05	5.00	4.94	4.89	4.84	4.78	4.73	4.67
81.0	5.42	5.51	5.60	5.69	5.82	5.77	5.71	5.66	5.60	5.55	5.50	5.44	5.39	5.33	5.28	5.23	5.17	5.12	5.06	5.01	4.96	4.90	4.85	4.79	4.74
81.5	5.48	5.57	5.66	5.75	5.89	5.83	5.78	5.72	5.67	5.62	5.56	5.51	5.45	5.40	5.35	5.29	5.24	5.18	5.13	5.08	5.02	4.97	4.91	4.86	4.81
82.0	5.54	5.63	5.72	5.81	5.95	5.90	5.84	5.79	5.74	5.68	5.63	5.57	5.52	5.47	5.41	5.36	5.30	5.25	5.20	5.14	5.09	5.03	4.98	4.93	4.87
82.5	5.60	5.69	5.78	5.87	6.02	5.96	5.91	5.86	5.80	5.75	5.69	5.64	5.59	5.53	5.48	5.42	5.37	5.32	5.26	5.21	5.15	5.10	5.05	4.99	4.94
83.0	5.65	5.74	5.83	5.92	6.08	6.03	5.98	5.92	5.87	5.81	5.76	5.71	5.65	5.60	5.54	5.49	5.44	5.38	5.33	5.27	5.22	5.17	5.11	5.06	5.00
83.5	5.71	5.80	5.89	5.98	6.15	6.10	6.04	5.99	5.93	5.88	5.83	5.77	5.72	5.66	5.61	5.56	5.50	5.45	5.39	5.34	5.29	5.23	5.18	5.12	5.07
84.0	5.77	5.86	5.95	6.04	6.22	6.16	6.11	6.05	6.00	5.95	5.89	5.84	5.78	5.73	5.68	5.62	5.57	5.51	5.46	5.41	5.35	5.30	5.24	5.19	5.14
84.5	5.83	5.92	6.01	6.10	6.28	6.23	6.17	6.12	6.07	6.01	5.96	5.90	5.85	5.80	5.74	5.69	5.63	5.58	5.53	5.47	5.42	5.36	5.31	5.26	5.20
85.0	5																								

TABLE 3. PREDICTED FVC FOR FEMALES (HUDSON, ET AL; AM REV RESPIR DIS, 1976, 113, 587.)

HT	AGE																								
	17	19	21	23	25	27	29	31	33	35	37	39	41	43	45	47	49	51	53	55	57	59	61	63	65
92.0	2.45	2.64	2.69	2.61	2.56	2.52	2.47	2.43	2.39	2.34	2.30	2.25	2.21	2.17	2.12	2.08	2.03	1.99	1.95	1.90	1.86	1.81	1.77	1.73	1.68
92.5	2.50	2.68	2.70	2.65	2.61	2.57	2.52	2.48	2.43	2.39	2.35	2.30	2.26	2.21	2.17	2.13	2.08	2.04	1.99	1.95	1.91	1.86	1.82	1.77	1.73
93.0	2.54	2.72	2.74	2.70	2.66	2.61	2.57	2.52	2.48	2.44	2.39	2.35	2.30	2.26	2.22	2.17	2.13	2.08	2.04	2.00	1.95	1.91	1.86	1.82	1.78
93.5	2.50	2.76	2.79	2.75	2.70	2.66	2.62	2.57	2.53	2.48	2.44	2.40	2.35	2.31	2.26	2.22	2.18	2.13	2.09	2.04	2.00	1.96	1.91	1.87	1.82
94.0	2.62	2.81	2.84	2.79	2.75	2.71	2.66	2.62	2.57	2.53	2.49	2.44	2.40	2.35	2.31	2.27	2.22	2.18	2.13	2.09	2.05	2.00	1.96	1.91	1.87
94.5	2.66	2.85	2.89	2.84	2.80	2.75	2.71	2.67	2.62	2.58	2.53	2.49	2.45	2.40	2.36	2.31	2.27	2.23	2.18	2.14	2.09	2.05	2.01	1.96	1.92
95.0	2.71	2.89	2.93	2.89	2.84	2.80	2.76	2.71	2.67	2.62	2.58	2.54	2.49	2.45	2.40	2.36	2.32	2.27	2.23	2.18	2.14	2.09	2.05	2.01	1.96
95.5	2.75	2.93	2.98	2.94	2.89	2.85	2.80	2.76	2.72	2.67	2.63	2.58	2.54	2.50	2.45	2.41	2.36	2.32	2.28	2.23	2.19	2.14	2.10	2.06	2.01
96.0	2.79	2.97	3.03	2.99	2.94	2.89	2.85	2.81	2.76	2.72	2.67	2.63	2.59	2.54	2.50	2.45	2.41	2.37	2.32	2.28	2.23	2.19	2.15	2.10	2.06
96.5	2.83	3.01	3.07	3.03	2.99	2.94	2.90	2.85	2.81	2.77	2.72	2.68	2.63	2.59	2.55	2.50	2.46	2.41	2.37	2.33	2.28	2.24	2.19	2.15	2.11
97.0	2.87	3.06	3.12	3.08	3.03	2.99	2.94	2.90	2.86	2.81	2.77	2.72	2.68	2.64	2.59	2.55	2.50	2.46	2.42	2.37	2.33	2.28	2.24	2.19	2.15
97.5	2.91	3.10	3.17	3.13	3.08	3.04	2.99	2.95	2.90	2.86	2.82	2.77	2.73	2.68	2.64	2.60	2.55	2.51	2.46	2.42	2.38	2.33	2.29	2.24	2.20
98.0	2.96	3.14	3.21	3.17	3.13	3.08	3.04	2.99	2.95	2.91	2.86	2.82	2.77	2.73	2.69	2.64	2.60	2.55	2.51	2.47	2.42	2.38	2.33	2.29	2.25
98.5	3.00	3.18	3.26	3.22	3.17	3.13	3.09	3.04	3.00	2.95	2.91	2.87	2.82	2.78	2.73	2.69	2.65	2.60	2.56	2.51	2.47	2.43	2.38	2.34	2.29
99.0	3.04	3.22	3.31	3.26	3.22	3.18	3.13	3.09	3.04	3.00	2.96	2.91	2.87	2.82	2.78	2.74	2.69	2.65	2.60	2.56	2.52	2.47	2.43	2.38	2.34
99.5	3.08	3.27	3.36	3.31	3.27	3.22	3.18	3.14	3.09	3.05	3.00	2.96	2.92	2.87	2.83	2.78	2.74	2.70	2.65	2.61	2.56	2.52	2.48	2.43	2.39
60.0	3.12	3.31	3.40	3.36	3.31	3.27	3.23	3.18	3.14	3.09	3.05	3.01	2.96	2.92	2.87	2.83	2.79	2.74	2.70	2.65	2.61	2.57	2.52	2.48	2.43
60.5	3.17	3.35	3.43	3.41	3.36	3.32	3.27	3.23	3.19	3.14	3.10	3.05	3.01	2.97	2.92	2.88	2.83	2.79	2.75	2.70	2.66	2.61	2.57	2.53	2.48
61.0	3.21	3.39	3.50	3.45	3.41	3.36	3.32	3.28	3.23	3.19	3.14	3.10	3.06	3.01	2.97	2.92	2.88	2.84	2.79	2.75	2.70	2.66	2.62	2.57	2.53
61.5	3.25	3.43	3.54	3.50	3.46	3.41	3.37	3.32	3.28	3.24	3.19	3.15	3.10	3.06	3.02	2.97	2.93	2.88	2.84	2.80	2.75	2.71	2.66	2.62	2.58
62.0	3.29	3.48	3.59	3.55	3.50	3.46	3.41	3.37	3.33	3.28	3.24	3.19	3.15	3.11	3.06	3.02	2.97	2.93	2.89	2.84	2.80	2.75	2.71	2.67	2.62
62.5	3.33	3.52	3.64	3.59	3.55	3.51	3.46	3.42	3.37	3.33	3.29	3.24	3.20	3.15	3.11	3.07	3.02	2.98	2.93	2.89	2.85	2.80	2.76	2.71	2.67
63.0	3.38	3.56	3.68	3.64	3.60	3.55	3.51	3.46	3.42	3.38	3.33	3.29	3.24	3.20	3.16	3.11	3.07	3.02	2.98	2.94	2.89	2.85	2.80	2.76	2.72
63.5	3.42	3.60	3.73	3.69	3.64	3.60	3.56	3.51	3.47	3.42	3.38	3.34	3.29	3.25	3.20	3.16	3.12	3.07	3.03	2.98	2.94	2.90	2.85	2.81	2.76
64.0	3.46	3.64	3.78	3.73	3.69	3.65	3.60	3.56	3.51	3.47	3.43	3.38	3.34	3.29	3.25	3.21	3.16	3.12	3.07	3.03	2.99	2.94	2.90	2.85	2.81
64.5	3.50	3.69	3.83	3.78	3.74	3.69	3.65	3.61	3.56	3.52	3.47	3.43	3.39	3.34	3.30	3.25	3.21	3.17	3.12	3.08	3.03	2.99	2.95	2.90	2.86
65.0	3.54	3.73	3.87	3.83	3.78	3.74	3.70	3.65	3.61	3.56	3.52	3.48	3.43	3.39	3.34	3.30	3.26	3.21	3.17	3.12	3.08	3.04	2.99	2.95	2.90
65.5	3.59	3.77	3.92	3.88	3.83	3.79	3.74	3.70	3.66	3.61	3.57	3.52	3.48	3.44	3.39	3.35	3.30	3.26	3.22	3.17	3.13	3.08	3.04	3.00	2.95
66.0	3.63	3.81	3.97	3.92	3.88	3.83	3.79	3.75	3.70	3.66	3.61	3.57	3.53	3.48	3.44	3.39	3.35	3.31	3.26	3.22	3.17	3.13	3.09	3.04	3.00
66.5	3.67	3.85	4.01	3.97	3.93	3.88	3.84	3.79	3.75	3.71	3.66	3.62	3.57	3.53	3.49	3.44	3.40	3.35	3.31	3.27	3.22	3.18	3.13	3.09	3.05
67.0	3.71	3.89	4.06	4.02	3.97	3.93	3.88	3.84	3.80	3.75	3.71	3.66	3.62	3.58	3.53	3.49	3.44	3.40	3.36	3.31	3.27	3.22	3.18	3.14	3.09
67.5	3.75	3.94	4.11	4.06	4.02	3.98	3.93	3.89	3.84	3.80	3.76	3.71	3.67	3.62	3.58	3.54	3.49	3.45	3.40	3.36	3.32	3.27	3.23	3.18	3.14
68.0	3.79	3.98	4.15	4.11	4.07	4.02	3.98	3.93	3.89	3.85	3.80	3.76	3.71	3.67	3.63	3.58	3.54	3.49	3.45	3.41	3.36	3.32	3.27	3.23	3.19
68.5	3.84	4.02	4.20	4.16	4.11	4.07	4.03	3.98	3.94	3.89	3.85	3.81	3.76	3.72	3.67	3.63	3.59	3.54	3.50	3.45	3.41	3.37	3.32	3.28	3.23
69.0	3.88	4.06	4.25	4.20	4.16	4.12	4.07	4.03	3.98	3.94	3.90	3.85	3.81	3.76	3.72	3.68	3.63	3.59	3.54	3.50	3.46	3.41	3.37	3.32	3.28
69.5	3.92	4.10	4.30	4.25	4.21	4.16	4.12	4.08	4.03	3.99	3.94	3.90	3.86	3.81	3.77	3.72	3.68	3.64	3.59	3.55	3.50	3.46	3.42	3.37	3.33
70.0	3.96	4.15	4.34	4.30	4.25	4.21	4.17	4.12	4.08	4.03	3.99	3.95	3.90	3.86	3.81	3.77	3.73	3.68	3.64	3.59	3.55	3.51	3.46	3.42	3.37
70.5	4.00	4.19	4.39	4.35	4.30	4.26	4.21	4.17	4.13	4.08	4.04	3.99	3.95	3.91	3.86	3.82	3.77	3.73	3.69	3.64	3.60	3.55	3.51	3.47	3.42
71.0	4.05	4.23	4.44	4.39	4.35	4.30	4.26	4.22	4.17	4.13	4.08	4.04	4.00	3.95	3.91	3.86	3.82	3.78	3.73	3.69	3.64	3.60	3.56	3.51	3.47
71.5	4.09	4.27	4.48	4.44	4.40	4.35	4.31	4.26	4.22	4.18	4.13	4.09	4.04	4.00	3.96	3.91	3.87	3.82	3.78	3.74	3.69	3.65	3.60	3.56	3.52
72.0	4.13	4.31	4.53	4.49	4.44	4.40	4.35	4.31	4.27	4.22	4.18	4.13	4.09	4.05	4.00	3.96	3.91	3.87	3.83	3.78	3.74	3.69	3.65	3.61	3.56
72.5	4.17	4.36	4.58	4.53	4.49	4.45	4.40	4.36	4.31	4.27	4.23	4.18	4.14	4.09	4.05	4.01	3.96	3.92	3.87	3.83	3.79	3.74	3.70	3.65	3.61
73.0	4.21	4.40	4.62	4.58	4.54	4.49	4.45	4.40	4.36	4.32	4.27	4.23	4.18	4.14	4.10	4.05	4.01	3.96	3.92	3.88	3.83	3.79	3.74	3.70	3.66
73.5	4.26	4.44	4.67	4.63	4.58	4.54	4.50	4.45	4.41	4.36	4.32	4.28	4.23	4.19	4.14	4.10	4.06	4.01	3.97	3.92	3.88	3.84	3.79	3.75	3.70
74.0	4.30	4.48	4.72	4.67	4.63	4.59	4.54	4.50	4.45	4.41	4.37	4.32	4.28	4.23	4.19	4.15	4.10	4.06	4.01	3.97	3.93	3.88	3.84	3.79	3.75
74.5	4.34	4.52	4.77	4.72	4.68	4.63	4.59	4.55	4.50	4.46	4.41	4.37	4.33	4.28	4.24	4.19	4.15	4.11	4.06	4.02	3.97	3.93	3.89	3.84	3.80
75.0	4.38	4.57	4.81	4.77	4.72	4.68	4.64	4.59	4.55	4.50	4.46	4.42	4.37	4.33	4.28	4.24	4.20	4.15	4.11	4.06	4.02	3.98	3.93	3.89	3.84
75.5	4.42	4.61	4.86	4.82	4.77	4.73	4.68	4.64	4.60	4.55	4.51	4.46	4.42	4.38	4.33	4.29	4.24	4.20	4.16	4.11	4.07	4.02	3.98	3.94	3.89
76.0	4.47	4.65	4.91	4.86	4.82	4.77	4.73	4.69	4.64	4.60	4.55	4.51	4.47	4.42	4.38	4.33	4.29	4.25	4.20	4.16	4.11	4.07	4.03	3.98	3.94
76.5	4.51	4.69	4.95	4.91	4.87	4.82	4.78	4.73	4.69	4.65	4.60	4.56	4.51	4.47	4.43	4.38	4.34	4.29	4.25	4.21	4.16	4.12	4.07	4.03	3.99
77.0	4.55	4.73																							

TABLE 4. PREDICTED FEV₁ FOR FEMALES (KHUDDON, ET AL. AM REV RESPIR DIS. 1976. 113. S87.)

AGE	17	19	21	23	25	27	29	31	33	35	37	39	41	43	45	47	49	51	53	55	57	59	61	63	65
52.0	2.31	2.48	2.33	2.29	2.25	2.21	2.16	2.12	2.00	2.04	2.00	1.95	1.91	1.87	1.83	1.79	1.74	1.70	1.66	1.62	1.58	1.53	1.49	1.45	1.41
52.5	2.34	2.51	2.37	2.32	2.28	2.24	2.20	2.16	2.11	2.07	2.03	1.99	1.95	1.90	1.86	1.82	1.78	1.74	1.69	1.65	1.61	1.57	1.53	1.48	1.44
53.0	2.38	2.55	2.40	2.36	2.32	2.27	2.23	2.19	2.15	2.11	2.06	2.02	1.98	1.94	1.90	1.85	1.81	1.77	1.73	1.69	1.64	1.60	1.56	1.52	1.48
53.5	2.41	2.58	2.43	2.39	2.35	2.31	2.27	2.22	2.18	2.14	2.10	2.06	2.01	1.97	1.93	1.89	1.85	1.80	1.76	1.72	1.68	1.64	1.59	1.55	1.51
54.0	2.45	2.62	2.47	2.43	2.38	2.34	2.30	2.26	2.22	2.17	2.13	2.09	2.05	2.01	1.96	1.92	1.88	1.84	1.80	1.75	1.71	1.67	1.63	1.59	1.54
54.5	2.48	2.65	2.50	2.46	2.42	2.38	2.33	2.29	2.25	2.21	2.17	2.12	2.08	2.04	2.00	1.96	1.91	1.87	1.83	1.79	1.75	1.70	1.66	1.62	1.58
55.0	2.51	2.68	2.54	2.49	2.45	2.41	2.37	2.33	2.28	2.24	2.20	2.16	2.12	2.07	2.03	1.99	1.95	1.91	1.86	1.82	1.78	1.74	1.70	1.65	1.61
55.5	2.55	2.72	2.57	2.53	2.49	2.45	2.41	2.37	2.32	2.28	2.24	2.19	2.15	2.11	2.07	2.03	1.98	1.94	1.90	1.86	1.82	1.77	1.73	1.69	1.65
56.0	2.58	2.75	2.61	2.56	2.52	2.48	2.44	2.40	2.35	2.31	2.27	2.23	2.19	2.14	2.10	2.06	2.02	1.98	1.93	1.89	1.85	1.81	1.77	1.72	1.68
56.5	2.62	2.79	2.64	2.60	2.56	2.51	2.47	2.43	2.39	2.35	2.30	2.26	2.22	2.18	2.14	2.09	2.05	2.01	1.97	1.93	1.88	1.84	1.80	1.76	1.72
57.0	2.65	2.82	2.67	2.63	2.59	2.55	2.51	2.46	2.42	2.38	2.34	2.30	2.25	2.21	2.17	2.13	2.09	2.04	2.00	1.96	1.92	1.88	1.83	1.79	1.75
57.5	2.69	2.86	2.71	2.67	2.62	2.58	2.54	2.50	2.46	2.41	2.37	2.33	2.29	2.25	2.20	2.16	2.12	2.08	2.04	1.99	1.95	1.91	1.87	1.83	1.78
58.0	2.72	2.89	2.74	2.70	2.66	2.62	2.57	2.53	2.49	2.45	2.41	2.36	2.32	2.28	2.24	2.20	2.15	2.11	2.07	2.03	1.99	1.94	1.90	1.86	1.82
58.5	2.75	2.92	2.78	2.73	2.69	2.65	2.61	2.57	2.52	2.48	2.44	2.40	2.36	2.31	2.27	2.23	2.19	2.15	2.10	2.06	2.02	1.98	1.94	1.89	1.85
59.0	2.79	2.96	2.81	2.77	2.73	2.69	2.64	2.60	2.56	2.52	2.48	2.43	2.39	2.35	2.31	2.27	2.22	2.18	2.14	2.10	2.06	2.01	1.97	1.93	1.89
59.5	2.82	2.99	2.85	2.80	2.76	2.72	2.68	2.64	2.59	2.55	2.51	2.47	2.43	2.38	2.34	2.30	2.26	2.22	2.17	2.13	2.09	2.05	2.01	1.96	1.92
60.0	2.86	3.03	2.88	2.84	2.80	2.75	2.71	2.67	2.63	2.59	2.54	2.50	2.46	2.42	2.38	2.33	2.29	2.25	2.21	2.17	2.12	2.08	2.04	2.00	1.96
60.5	2.89	3.06	2.91	2.87	2.83	2.79	2.75	2.70	2.66	2.62	2.58	2.54	2.49	2.45	2.41	2.37	2.33	2.28	2.24	2.20	2.16	2.12	2.07	2.03	1.99
61.0	2.93	3.10	2.95	2.91	2.86	2.82	2.78	2.74	2.70	2.65	2.61	2.57	2.53	2.49	2.44	2.40	2.36	2.32	2.28	2.23	2.19	2.15	2.11	2.07	2.02
61.5	2.96	3.13	2.98	2.94	2.90	2.86	2.81	2.77	2.73	2.69	2.65	2.60	2.56	2.52	2.48	2.44	2.39	2.35	2.31	2.27	2.23	2.18	2.14	2.10	2.06
62.0	2.99	3.16	3.02	2.97	2.93	2.89	2.85	2.81	2.76	2.72	2.68	2.64	2.60	2.55	2.51	2.47	2.43	2.39	2.34	2.30	2.26	2.22	2.18	2.13	2.09
62.5	3.03	3.20	3.05	3.01	2.97	2.93	2.88	2.84	2.80	2.76	2.72	2.67	2.63	2.59	2.55	2.51	2.46	2.42	2.38	2.34	2.29	2.25	2.21	2.17	2.13
63.0	3.06	3.23	3.09	3.04	3.00	2.96	2.92	2.88	2.83	2.79	2.75	2.71	2.67	2.62	2.58	2.54	2.50	2.46	2.41	2.37	2.33	2.29	2.25	2.21	2.16
63.5	3.10	3.27	3.12	3.08	3.04	2.99	2.95	2.91	2.87	2.83	2.78	2.74	2.70	2.66	2.62	2.57	2.53	2.49	2.45	2.41	2.36	2.32	2.28	2.24	2.20
64.0	3.13	3.30	3.15	3.11	3.07	3.03	2.99	2.94	2.90	2.86	2.82	2.78	2.73	2.69	2.65	2.61	2.57	2.52	2.48	2.44	2.40	2.36	2.31	2.27	2.23
64.5	3.17	3.34	3.19	3.15	3.10	3.06	3.02	2.98	2.94	2.89	2.85	2.81	2.77	2.73	2.69	2.64	2.60	2.56	2.52	2.47	2.43	2.39	2.35	2.31	2.26
65.0	3.20	3.37	3.22	3.18	3.14	3.10	3.05	3.01	2.97	2.93	2.89	2.84	2.80	2.76	2.72	2.68	2.63	2.59	2.55	2.51	2.47	2.42	2.38	2.34	2.30
65.5	3.23	3.40	3.26	3.21	3.17	3.13	3.09	3.05	3.00	2.96	2.92	2.88	2.84	2.79	2.75	2.71	2.67	2.63	2.58	2.54	2.50	2.46	2.42	2.37	2.33
66.0	3.27	3.44	3.29	3.25	3.21	3.17	3.12	3.08	3.04	3.00	2.96	2.91	2.87	2.83	2.79	2.75	2.70	2.66	2.62	2.58	2.54	2.49	2.45	2.41	2.37
66.5	3.30	3.47	3.33	3.28	3.24	3.20	3.16	3.12	3.07	3.03	2.99	2.95	2.91	2.86	2.82	2.78	2.74	2.70	2.65	2.61	2.57	2.53	2.49	2.44	2.40
67.0	3.34	3.51	3.36	3.32	3.28	3.23	3.19	3.15	3.11	3.07	3.02	2.98	2.94	2.90	2.86	2.81	2.77	2.73	2.69	2.65	2.60	2.56	2.52	2.48	2.44
67.5	3.37	3.54	3.39	3.35	3.31	3.27	3.23	3.18	3.14	3.10	3.06	3.02	2.97	2.93	2.89	2.85	2.81	2.76	2.72	2.68	2.64	2.60	2.55	2.51	2.47
68.0	3.41	3.58	3.43	3.39	3.34	3.30	3.26	3.22	3.18	3.13	3.09	3.05	3.01	2.97	2.92	2.88	2.84	2.80	2.76	2.71	2.67	2.63	2.59	2.55	2.50
68.5	3.44	3.61	3.46	3.42	3.38	3.34	3.29	3.25	3.21	3.17	3.13	3.08	3.04	3.00	2.96	2.92	2.87	2.83	2.79	2.75	2.71	2.66	2.62	2.58	2.54
69.0	3.47	3.64	3.50	3.46	3.41	3.37	3.33	3.29	3.25	3.20	3.16	3.12	3.08	3.04	2.99	2.95	2.91	2.87	2.83	2.78	2.74	2.70	2.66	2.62	2.57
69.5	3.51	3.68	3.53	3.49	3.45	3.41	3.36	3.32	3.28	3.24	3.20	3.15	3.11	3.07	3.03	2.99	2.94	2.90	2.86	2.82	2.78	2.73	2.69	2.65	2.61
70.0	3.54	3.71	3.57	3.52	3.48	3.44	3.40	3.36	3.31	3.27	3.23	3.19	3.15	3.10	3.06	3.02	2.98	2.94	2.89	2.85	2.81	2.77	2.73	2.68	2.64
70.5	3.58	3.75	3.60	3.56	3.52	3.47	3.43	3.39	3.35	3.31	3.26	3.22	3.18	3.14	3.10	3.05	3.01	2.97	2.93	2.89	2.84	2.80	2.76	2.72	2.68
71.0	3.61	3.78	3.63	3.59	3.55	3.51	3.47	3.42	3.38	3.34	3.30	3.26	3.21	3.17	3.13	3.09	3.05	3.00	2.96	2.92	2.88	2.84	2.79	2.75	2.71
71.5	3.65	3.82	3.67	3.63	3.59	3.54	3.50	3.46	3.42	3.37	3.33	3.29	3.25	3.21	3.16	3.12	3.08	3.04	3.00	2.95	2.91	2.87	2.83	2.79	2.74
72.0	3.68	3.85	3.70	3.66	3.62	3.58	3.53	3.49	3.45	3.41	3.37	3.32	3.28	3.24	3.20	3.16	3.11	3.07	3.03	2.99	2.95	2.90	2.86	2.82	2.77
72.5	3.71	3.88	3.74	3.70	3.65	3.61	3.57	3.53	3.49	3.44	3.40	3.36	3.32	3.28	3.23	3.19	3.15	3.11	3.07	3.02	2.98	2.94	2.90	2.86	2.81
73.0	3.75	3.92	3.77	3.73	3.69	3.65	3.60	3.56	3.52	3.48	3.44	3.39	3.35	3.31	3.27	3.23	3.18	3.14	3.10	3.06	3.02	2.97	2.93	2.89	2.85
73.5	3.78	3.95	3.81	3.76	3.72	3.68	3.64	3.60	3.55	3.51	3.47	3.43	3.39	3.34	3.30	3.26	3.22	3.18	3.13	3.09	3.05	3.01	2.97	2.92	2.88
74.0	3.82	3.99	3.84	3.80	3.76	3.71	3.67	3.63	3.59	3.55	3.50	3.46	3.42	3.38	3.34	3.29	3.25	3.21	3.17	3.13	3.08	3.04	3.00	2.96	2.92
74.5	3.85	4.02	3.87	3.83	3.79	3.75	3.71	3.66	3.62	3.58	3.54	3.50	3.45	3.41	3.37	3.33	3.29	3.24	3.20	3.16	3.12	3.08	3.03	2.99	2.95
75.0	3.89	4.06	3.91	3.87	3.82	3.78	3.74	3.70	3.66	3.61	3.57	3.53	3.49	3.45	3.40	3.36	3.32	3.28	3.24	3.19	3.15	3.11	3.07	3.03	2.98
75.5	3.92	4.09	3.94	3.90	3.86	3.82	3.77	3.73	3.69	3.65	3.61	3.56	3.52	3.48	3.44	3.40	3.35	3.31	3.27	3.23	3.19	3.14	3.10	3.06	3.02
76.0	3.95	4.12	3.98	3.94	3.89	3.85	3.81	3.77	3.73	3.69	3.64	3.60	3.56	3.52	3.47	3.43	3.39	3.35	3.31	3.26	3.22	3.18	3.14	3.10	3.05
76.5	3.99	4.16	4.01	3.97	3.93	3.89	3.84	3.80	3.76	3.72	3.68	3.63	3.59	3.55	3.51	3.47	3.42	3.38	3.34	3.30	3.26	3.21	3.17	3.13	3.09
77.0	4.02	4.19	4.05																						

± 50 ml or within ± 3 percent of reading, whichever is greater.

(j) The instrument must be capable of being calibrated in the field with respect to the FEV_1 and FVC. This calibration of the FEV_1 and FVC may be either directly or indirectly through volume and time base measurements. The volume calibration source should provide a volume displacement of at least 2 liters and should be accurate to within ± 30 milliliters.

(2) Technique for measurement of forced vital capacity maneuver.

(a) Use of a nose clip is recommended but not required. The procedures shall be explained in simple terms to the patient who shall be instructed to loosen any tight clothing and stand in front of the apparatus. The subject may sit, but care should be taken on repeat testing that same position be used and, if possible, the same spirometer. Particular attention shall be given to insure that the chin is slightly elevated with the neck slightly extended. The patient shall be instructed to make a full inspiration from a normal breathing pattern and then blow into the apparatus, without interruption, as hard, fast, and completely as possible. At least three forced expirations shall be carried out. During the maneuvers, the patient shall be observed for compliance with instructions. The expirations shall be checked visually for reproducibility from flow-volume or volume-time tracings or displays. The following efforts shall be judged unacceptable when the patient:

(i) Has not reached full inspiration preceding the forced expiration,

(ii) Has not used maximal effort during the entire forced expiration,

(iii) Has not continued the expiration for at least 5 seconds or until an obvious plateau in the volume time curve has occurred,

(iv) Has coughed or closed his glottis,

(v) Has an obstructed mouthpiece or a leak around the mouthpiece (obstruction due to tongue being placed in front of mouthpiece, false teeth falling in front of mouthpiece, etc.),

(vi) Has an unsatisfactory start of expiration, one characterized by excessive hesitation (or false starts), and therefore not allowing back extrapolation of time 0 (extrapolated volume on the volume time tracing must be less than 10 percent of the FVC),

(vii) Has an excessive variability between the three acceptable curves. The variation between the two largest FVC's and FEV_1 's of the three satisfactory tracings should not exceed 10 percent or ± 100 milliliters, whichever is greater.

(b) Periodic and routine recalibration of the instrument or method for recording FVC and $FEV_{1,0}$ should be performed using a syringe or other volume source of at least 2 liters.

(3) Interpretation of spirogram.

(a) The first step in evaluating a spirogram should be to determine whether or not the patient has performed the test properly or as described in subsection (2) of this section. From the three satisfactory tracings, the forced vital capacity (FVC) and forced expiratory volume in 1 second ($FEV_{1,0}$) shall be measured and recorded. The largest observed FVC

and largest observed $FEV_{1,0}$ shall be used in the analysis regardless of the curve(s) on which they occur.

(b) The following guidelines are recommended by NIOSH for the evaluation and management of workers exposed to cotton dust. It is important to note that employees who show reductions in FEV_1/FVC ratio below .75 or drops in Monday FEV_1 of 5 percent or greater on their initial screening exam, should be reevaluated within a month of the first exam. Those who show consistent decrease in lung function, as shown on the following table, should be managed as recommended.

(4) Qualifications of personnel administering the test.

Technicians who perform pulmonary function testing should have the basic knowledge required to produce meaningful results. Training consisting of approximately 16 hours of formal instruction should cover the following areas.

(a) Basic physiology of the forced vital capacity maneuver and the determinants of airflow limitation with emphasis on the relation to reproducibility of results.

(b) Instrumentation requirements including calibration procedures, sources of error and their correction.

(c) Performance of the testing including subject coaching, recognition of improperly performed maneuvers and corrective actions.

(d) Data quality with emphasis on reproducibility.

(e) Actual use of the equipment under supervised conditions.

(f) Measurement of tracings and calculations of results.

[Statutory Authority: Chapter 49.17 RCW. 88-14-108 (Order 88-11), § 296-62-14541, filed 7/6/88; 87-24-051 (Order 87-24), § 296-62-14541, filed 11/30/87.]

WAC 296-62-14543 Appendix E—Vertical elutriator equivalency protocol. (a) Samples to be taken—In order to ascertain equivalency, it is necessary to collect a total of 100 samples from at least 10 sites in a mill. That is, there should be 10 replicate readings at each of 10 sites. The sites should represent dust levels which vary over the allowable range of 0.5 to 2 times the permissible exposure limit. Each sample requires the use of two vertical elutriators (VE's) and at least one but not more than two alternative devices (AD's). Thus, the end result is 200 VE readings and either 100 or 200 AD readings. The 2 VE readings and the 1 or 2 AD readings at each time and site must be made simultaneously. That is, the two VE's and one or two AD's must be arranged together in such a way that they are measuring essentially the same dust levels.

(b) Data averaging—The two VE readings taken at each site are then averaged. These averages are to be used as the 100 VE readings. If two alternate devices were used, their test results are also averaged. Thus, after this step is accomplished, there will be 100 VE readings and 100 AD readings.

(c) Differences—For each of the 100 sets of measurements (VE and AD) the difference is obtained as the average VE reading minus the AD reading. Call these differences D_i . Thus, we have.

$$D_i = VE_i - AD_i, \quad i = 1, 2, \dots, 100 \quad (1)$$

Next we compute the arithmetic mean and standard deviations of the differences, using equations (2) and (3), respectively.

$$\bar{x}_D = \frac{1}{N} \sum_{i=1}^N D_i \quad (2)$$

$$s_D = \sqrt{\frac{\sum_{i=1}^N D_i^2 - \frac{(\sum_{i=1}^N D_i)^2}{N}}{N-1}} \quad (3)$$

where N equals the number of differences (100 in this case), \bar{x}_D is the arithmetic mean and s_D is the standard deviation.

We next calculate the critical value as $T = K s_D \div |\bar{x}_D|$ where $K = 1.87$, based on 100 samples.

(d) Equivalency test. The next step is to obtain the average of the 100 VE readings. This is obtained by equation (4)

$$\bar{x}_{VE} = \frac{1}{N} \left(\sum_{i=1}^N VE_i \right) \quad (4)$$

We next multiply 0.25 by \bar{x}_{VE} . If $T < 0.25 \bar{x}_{VE}$, we can say that the alternate device has passed the equivalency test.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 86-16-009 (Order 86-28), § 296-62-14543, filed 7/25/86.]

PART O—COKE OVENS

WAC 296-62-200 **Coke oven emissions.** Scope and application. This section applies to the control of employee exposure to coke oven emissions.

[Order 77-14, § 296-62-200, filed 7/25/77.]

WAC 296-62-20001 **Definitions.** For the purpose of this section:

(1) "Authorized person." Any person specifically authorized by the employer whose duties require the person to enter a regulated area, or any person entering such an area as a designated representative of employees for the purpose of exercising the opportunity to observe monitoring and measuring procedures under WAC 296-62-20025.

(2) "Beehive oven." A coke oven in which the products of carbonization other than coke are not recovered, but are released into the ambient air.

(3) "Coke oven." A retort in which coke is produced by the destructive distillation or carbonization of coal.

(4) "Coke oven battery." A structure containing a number of slot-type coke ovens.

(5) "Coke oven emissions." The benzenesoluble fraction of total particulate matter present during the destructive distillation or carbonization of coal for the production of coke.

(6) "Director." The director of the department of labor and industries or his or her authorized representative.

(7) "Emergency." Any occurrence such as, but not limited to, equipment failure which is likely to, or does, result in any massive release of coke oven emissions.

(8) "Existing coke oven battery." A battery in operation or under construction on January 20, 1977, and which is not rehabilitated.

(9) "Rehabilitated coke oven battery." A battery which is rebuilt, overhauled, renovated, or restored such as from the pad up, after January 20, 1977.

(10) "Stage charging." A procedure by which a predetermined volume of coal in each larry car hopper is introduced into an oven such that no more than two hoppers are discharging simultaneously.

(11) "Sequential charging." A procedure, usually automatically timed, by which a predetermined volume of coal in each larry car hopper is introduced into an oven such that no more than two hoppers commence or finish discharging simultaneously although, at some point, all hoppers are discharging simultaneously.

(12) "Pipeline charging." Any apparatus used to introduce coal into an oven which uses a pipe or duct permanently mounted onto an oven and through which coal is charged.

(13) "Green push." Coke which when removed from the oven results in emissions due to the presence of unvolytized coal.

[Order 77-14, § 296-62-20001, filed 7/25/77.]

WAC 296-62-20003 **Permissible exposure limit.** The employer shall assure that no employee is exposed to coke oven emissions at concentrations greater than 150 micrograms per cubic meter of air (150 ug/m³), averaged over any 8-hour period.

[Order 77-14, § 296-62-20003, filed 7/25/77.]

WAC 296-62-20005 **Regulated areas.** (1) The employer shall establish regulated areas and shall limit access to them to authorized persons.

(2) The employer shall establish the following as regulated areas:

(a) The coke oven battery including topside and its machinery, pushside and its machinery, coke side and its machinery, and the battery ends; the wharf; and the screening station;

(b) The beehive oven and its machinery.

[Order 77-14, § 296-62-20005, filed 7/25/77.]

WAC 296-62-20007 **Exposure monitoring and measurement.** (1) Monitoring program.

(a) Each employer who has a place of employment where coke oven emissions are present shall monitor employees employed in the regulated area to measure their exposure to coke oven emissions.

(b) The employer shall obtain measurements which are representative of each employee's exposure to coke oven emissions over an eight-hour period. All measurements shall determine exposure without regard to the use of respiratory protection.

(c) The employer shall collect full-shift (for at least seven continuous hours) personal samples, including at least one sample during each shift for each battery and each job classification within the regulated areas including at least the following job classifications:

- (i) Lidman;
- (ii) Tar chaser;
- (iii) Larry car operator;
- (iv) Luterman;
- (v) Machine operator, coke side;
- (vi) Benchman, coke side;
- (vii) Benchman, pusher side;
- (viii) Heater;
- (ix) Quenching car operator;
- (x) Pusher machine operator;
- (xi) Screening station operator;
- (xii) Wharfman;
- (xiii) Oven patcher;
- (xiv) Oven repairman;
- (xv) Spellman; and
- (xvi) Maintenance personnel.

(d) The employer shall repeat the monitoring and measurements required by subsection (1) of this section at least every three months.

(2) Redetermination. Whenever there has been a production, process, or control change which may result in new or additional exposure to coke oven emissions, or whenever the employer has any other reason to suspect an increase in employee exposure, the employer shall repeat the monitoring and measurements required by subsection (1) of this section for those employees affected by such change or increase.

(3) Employee notification.

(a) The employer shall notify each employee in writing of the exposure measurements which represent that employee's exposure within five working days after the receipt of the results of measurements required by subsection (1) and (2) of this section.

(b) Whenever such results indicate that the representative employee exposure exceeds the permissible exposure limit, the employer shall, in such notification, inform each employee of that fact and of the corrective action being taken to reduce exposure to or below the permissible exposure limit.

(4) Accuracy of measurement. The employer shall use a method of monitoring and measurement which has an accuracy (with a confidence level of 95%) of not less than plus or minus 35% for concentrations of coke oven emissions greater than or equal to 150 Ug/m³.

[Order 77-14, § 296-62-20007, filed 7/25/77.]

WAC 296-62-20009 Methods of compliance. The employer shall control employee exposure to coke oven emissions by the use of engineer controls, work practices and respiratory protection as follows:

(1) Priority of compliance methods.

(a) Existing coke oven batteries.

(i) The employer shall institute the engineer and work practice controls listed in subsections (2), (3) and (4) of this section in existing coke oven batteries at the earliest possible

time, but not later than January 20, 1980, except to the extent that the employer can establish that such controls are not feasible. In determining the earliest possible time for institution of engineer and work practice controls, the requirement, effective August 27, 1971, to implement feasible administrative or engineer controls to reduce exposures to coal tar pitch volatiles, shall be considered. Wherever the engineer and work practice controls which can be instituted are not sufficient to reduce employee exposures to or below the permissible exposure limit, the employer shall nonetheless use them to reduce exposures to the lowest level achievable by these controls and shall supplement them by the use of respiratory protection which complies with the requirements of WAC 296-62-20011.

(ii) The engineer and work practice controls required under subsections (2), (3) and (4) of this section are minimum requirements generally applicable to all existing coke oven batteries. If, after implementing all controls required by subsections (2), (3) and (4) of this section, or after January 20, 1980, whichever is sooner, employee exposures still exceed the permissible exposure limit, employers shall implement any other engineer and work practice controls necessary to reduce exposure to or below the permissible exposure limit except to the extent that the employer can establish that such controls are not feasible. Whenever the engineer and work practice controls which can be instituted are not sufficient to reduce employee exposures to or below the permissible exposure limit, the employer shall nonetheless use them to reduce exposures to the lowest level achievable by these controls and shall supplement them by the use of respiratory protection which complies with the requirements of WAC 296-62-20011.

(b) New or rehabilitated coke oven batteries.

(i) The employer shall institute the best available engineer and work practice controls on all new or rehabilitated coke oven batteries to reduce and maintain employee exposures at or below the permissible exposure limit, except to the extent that the employer can establish that such controls are not feasible. Wherever the engineer and work practice controls which can be instituted are not sufficient to reduce employee exposures to or below the permissible exposure limit, the employer shall nonetheless use them to reduce exposures to the lowest level achievable by these controls and shall supplement them by the use of respiratory protection which complies with the requirements of WAC 296-62-20011.

(ii) If, after implementing all the engineer and work practice controls required by (b)(i) of this subsection, employee exposures still exceed the permissible exposure limit, the employer shall implement any other engineer and work practice controls necessary to reduce exposure to or below the permissible exposure limit except to the extent that the employer can establish that such controls are not feasible. Wherever the engineer and work practice controls which can be instituted are not sufficient to reduce employee exposures to or below the permissible exposure limit, the employer shall nonetheless use them to reduce exposures to the lowest level achievable by these controls and shall supplement them by the use of respiratory protection which complies with the requirements of WAC 296-62-20011.

(c) Beehive ovens.

(i) The employer shall institute engineer and work practice controls on all beehive ovens at the earliest possible time to reduce and maintain employee exposures at or below the permissible exposure limit, except to the extent that the employer can establish that such controls are not feasible. In determining the earliest possible time for institution of engineer and work practice controls, the requirement, effective August 27, 1971, to implement feasible administrative or engineer controls to reduce exposures to coal tar pitch volatiles, shall be considered. Wherever the engineer and work practice controls which can be instituted are not sufficient to reduce employee exposures to or below the permissible exposure limit, the employer shall nonetheless use them to reduce exposures to the lowest level achievable by these controls and shall supplement them by the use of respiratory protection which complies with the requirements of WAC 296-62-20011.

(ii) If, after implementing all engineer and work practice controls required by (c)(i) of this subsection, employee exposures still exceed the permissible exposure limit, the employer shall implement any other engineer and work practice controls necessary to reduce exposures to or below the permissible exposure limit except to the extent that the employer can establish that such controls are not feasible. Whenever the engineer and work practice controls which can be instituted are not sufficient to reduce employee exposures to or below the permissible exposure limit, the employer shall nonetheless use them to reduce exposures to the lowest level achievable by these controls and shall supplement them by the use of respiratory protection which complies with the requirements of WAC 296-62-20011.

(2) Engineer controls.

(a) Charging. The employer shall equip and operate existing coke oven batteries with all of the following engineer controls to control coke oven emissions during charging operations:

(i) One of the following methods of charging:

(A) Stage charging as described in subsection (3)(a)(ii) of this section; or

(B) Sequential charging as described in subsection (3)(a)(ii) of this section except that subsection (3)(a)(ii) and (3)(d) of this section does not apply to sequential charging; or

(C) Pipeline charging or other forms of enclosed charging in accordance with (a) of this subsection, except (a)(ii), (iv), (v), (vi) and (viii) of this subsection do not apply.

(ii) Drafting from two or more points in the oven being charged, through the use of double collector mains, or a fixed or moveable jumper pipe system to another oven, to effectively remove the gases from the oven to the collector mains;

(iii) Aspiration systems designed and operated to provide sufficient negative pressure and flow volume to effectively move the gases evolved during charging into the collector mains, including sufficient steam pressure, and steam jets of sufficient diameter;

(iv) Mechanical volumetric controls on each larry car hopper to provide the proper amount of coal to be charged through each charging hole so that the tunnel head will be

sufficient to permit the gases to move from the oven into the collector mains;

(v) Devices to facilitate the rapid and continuous flow of coal into the oven being charged, such as stainless steel liners, coal vibrators or pneumatic shells;

(vi) Individually operated larry car drop sleeves and slide gates designed and maintained so that the gases are effectively removed from the oven into the collector mains;

(vii) Mechanized gooseneck and standpipe cleaners;

(viii) Air seals on the pusher machine leveler bars to control air infiltration during charging; and

(ix) Roof carbon cutters or a compressed air system or both on the pusher machine rams to remove roof carbon.

(b) Coking. The employer shall equip and operate existing coke oven batteries with all of the following engineer controls to control coke oven emissions during coking operations:

(i) A pressure control system on each battery to obtain uniform collector main pressure;

(ii) Ready access to door repair facilities capable of prompt and efficient repair of doors, door sealing edges and all door parts;

(iii) An adequate number of spare doors available for replacement purposes;

(iv) Chuck door gaskets to control chuck door emissions until such door is repaired, or replaced; and

(v) Heat shields on door machines.

(3) Work practice controls.

(a) Charging. The employer shall operate existing coke oven batteries with all of the following work practices to control coke oven emissions during the charging operation:

(i) Establishment and implementation of a detailed, written inspection and cleaning procedure for each battery consisting of at least the following elements:

(A) Prompt and effective repair or replacement of all engineer controls;

(B) Inspection and cleaning of goosenecks and standpipes prior to each charge to a specified minimum diameter sufficient to effectively move the evolved gases from the oven to the collector mains;

(C) Inspection for roof carbon build-up prior to each charge and removal of roof carbon as necessary to provide an adequate gas channel so that the gases are effectively moved from the oven into the collector mains;

(D) Inspection of the steam aspiration system prior to each charge so that sufficient pressure and volume is maintained to effectively move the gases from the oven to the collector mains;

(E) Inspection of steam nozzles and liquor sprays prior to each charge and cleaning as necessary so that the steam nozzles and liquor sprays are clean;

(F) Inspection of standpipe caps prior to each charge and cleaning and luting or both as necessary so that the gases are effectively moved from the oven to the collector mains; and

(G) Inspection of charging holes and lids for cracks, warpage and other defects prior to each charge and removal of carbon to prevent emissions, and application of luting material to standpipe and charging hole lids where necessary to obtain a proper seal.

(ii) Establishment and implementation of a detailed written charging procedure, designed and operated to eliminate emissions during charging for each battery, consisting of at least the following elements:

(A) Larry car hoppers filled with coal to a predetermined level in accordance with the mechanical volumetric controls required under subsection (2)(a)(iv) of this section so as to maintain a sufficient gas passage in the oven to be charged;

(B) The larry car aligned over the oven to be charged, so that the drop sleeves fit tightly over the charging holes; and

(C) The oven charged in accordance with the following sequence of requirements:

(I) The aspiration system turned on;

(II) Coal charged through the outermost hoppers, either individually or together, depending on the capacity of the aspiration system to collect the gases involved;

(III) The charging holes used under (a)(ii) and (b) of this subsection relidded or otherwise sealed off to prevent leakage of coke oven emissions;

(IV) If four hoppers are used, the third hopper discharged and relidded or otherwise sealed off to prevent leakage of coke oven emissions;

(V) The final hopper discharged until the gas channel at the top of the oven is blocked and then the chuck door opened and the coal leveled;

(VI) When the coal from the final hopper is discharged and the leveling operation complete, the charging hole relidded or otherwise sealed off to prevent leakage of coke oven emissions; and

(VII) The aspiration system turned off only after the charging holes have been closed.

(VIII) Establishment and implementation of a detailed written charging procedure, designed and operated to eliminate emissions during charging of each pipeline or enclosed charged battery.

(b) Coking. The employer shall operate existing coke oven batteries pursuant to a detailed written procedure established and implemented for the control of coke oven emissions during coking, consisting of at least the following elements:

(i) Checking oven back pressure controls to maintain uniform pressure conditions in the collecting main;

(ii) Repair, replacement and adjustment of oven doors and check doors and replacement of door jambs so as to provide a continuous metal-to-metal fit;

(iii) Cleaning of oven doors, chuck doors and door jambs each coking cycle so as to provide an effective seal;

(iv) An inspection system and corrective action program to control door emissions to the maximum extent possible; and

(v) Luting of doors that are sealed by luting each coking cycle and reluting, replacing or adjusting as necessary to control leakage.

(c) Pushing. The employer shall operate existing coke oven batteries with the following work practices to control coke oven emissions during pushing operations:

(i) Coke and coal spillage quenched as soon as practicable and not shoveled into a heated oven; and

(ii) A detailed written procedure for each battery established and implemented for the control of emissions during pushing consisting of the following elements:

(A) Dampening off the ovens and removal of charging hole lids to effectively control coke oven emissions during the push;

(B) Heating of the coal charge uniformly for a sufficient period so as to obtain proper coking including preventing green pushes;

(C) Prevention of green pushes to the maximum extent possible;

(D) Inspection, adjustment and correction of heating flue temperatures and defective flues at least weekly and after any green push, so as to prevent green pushes;

(E) Cleaning of heating flues and related equipment to prevent green pushes, at least weekly and after any green push.

(d) Maintenance and repair. The employer shall operate existing coke oven batteries pursuant to a detailed written procedure of maintenance and repair established and implemented for the effective control of coke oven emissions consisting of the following elements:

(i) Regular inspection of all controls, including goose-necks, standpipes, standpipe caps, charging hole lids and castings, jumper pipes and air seals for cracks, misalignment or other defects and prompt implementation of the necessary repairs as soon as possible;

(ii) Maintaining the regulated area in a neat, orderly condition free of coal and coke spillage and debris;

(iii) Regular inspection of the damper system, aspiration system and collector main for cracks or leakage, and prompt implementation of the necessary repairs;

(iv) Regular inspection of the heating system and prompt implementation of the necessary repairs;

(v) Prevention of miscellaneous fugitive topside emissions;

(vi) Regular inspection and patching of over brickwork;

(vii) Maintenance of battery equipment and controls in good working order;

(viii) Maintenance and repair of coke oven doors, chuck doors, door jambs and seals; and

(ix) Repairs instituted and completed as soon as possible, including temporary repair measures instituted and completed where necessary, including but not limited to:

(A) Prevention of miscellaneous fugitive topside emissions; and

(B) Chuck door gaskets, which shall be installed prior to the start of the next coking cycle.

(4) Filtered air.

(a) The employer shall provide positive-pressure, temperature controlled filtered air for larry car, pusher machine, door machine, and quench car cabs.

(b) The employer shall provide standby pulpits on the battery topside, at the wharf, and at the screening station, equipped with positive-pressure, temperature controlled filtered air.

(5) Emergencies. Whenever an emergency occurs, the next coking cycle may not begin until the cause of the emergency is determined and corrected, unless the employer can establish that it is necessary to initiate the next coking cycle in order to determine the cause of the emergency.

(6) Compliance program.

(a) Each employer shall establish and implement a written program to reduce exposures solely by means of the engineer and work practice controls specified in subsections (2) through (4) of this section.

(b) The written program shall include at least the following:

(i) A description of each coke oven operation by battery, including work force and operating crew, coking time, operating procedures and maintenance practices;

(ii) Engineer plans and other studies used to determine the controls for the coke battery;

(iii) A report of the technology considered in meeting the permissible exposure limit;

(iv) Monitoring data obtained in accordance with WAC 296-62-20007.

(v) A detailed schedule for the implementation of the engineer and work practice controls specified in subsections (2) through (4) of this section; and

(vi) Other relevant information.

(c) If, after implementing all controls required by subsections (2) through (4) of this section, or after January 20, 1980, whichever is sooner, or after completion of a new or rehabilitated battery the permissible exposure limit is still exceeded, the employer shall develop a detailed written program and schedule for the implementation of any additional engineer controls and work practices necessary to reduce exposure to or below the permissible exposure limit.

(d) Written plans for such programs shall be submitted, upon request, to the director, and shall be available at the worksite for examination and copying by the director, and the authorized employee representative. The plans required under this subsection shall be revised and updated at least every six months to reflect the current status of the program.

(7) Training in compliance procedures. The employer shall incorporate all written procedures and schedules required under this section in the education and training program required under WAC 296-62-20019 and, where appropriate, post in the regulated area.

[Statutory Authority: Chapter 49.17 RCW. 88-23-054 (Order 88-25), § 296-62-20009, filed 11/14/88. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-16-009 (Order 86-28), § 296-62-20009, filed 7/25/86; Order 77-14, § 296-62-20009, filed 7/25/77.]

WAC 296-62-20011 Respiratory protection. (1) General.

(a) Where respiratory protection is required under this section, the employer shall provide and assure the use of respirators which comply with the requirements of this section. Compliance with the permissible limit exposure may not be achieved by the use of respirators except:

(i) During the time period necessary to install or implement feasible engineering and work practice controls; or

(ii) In work operations such as maintenance and repair activity in which engineering and work practice controls are technologically not feasible; or

(iii) In work situations where feasible engineering and work practice controls are not yet sufficient to reduce exposure to or below the permissible exposure limit; or

(iv) In emergencies.

(b) Notwithstanding any other requirement of this section, until January 20, 1978, the wearing of respirators shall be at the discretion of each employee where the employee is not in the vicinity of visible emissions.

(2) Selection.

(a) Where respirators are required under this section, the employer shall select, provide and assure the use of the appropriate respirator or combination of respirators from Table I below.

TABLE I

RESPIRATORY PROTECTION FOR COKE OVEN EMISSIONS

Airborne concentration of coke oven emissions	Required respirator
(i) Any concentration.	(A) A Type C supplied air respirator operated in pressure demand or other positive pressure or continuous flow mode; or (B) A powered air-purifying particulate filter respirator for dust, mist, and fume; or (C) A powered air-purifying particulate filter respirator combination chemical cartridge and particulate filter respirator for coke oven emissions.
(ii) Concentrations not greater than 1500 µg/m ³ .	(A) Any particulate filter respirator for dust, mist and fume, except single-use respirator; or (B) Any particulate filter respirator or combination chemical cartridge and particulate filter respirator for coke oven emissions; or (C) Any respirator listed in subsection (2)(a)(i) of this section.

(b) Not later than January 20, 1978, whenever respirators are required by this section for concentrations not greater than 1500 µg/m³, the employer shall provide, at the option of each affected employee, either a particulate filter respirator as provided in subsection (2)(a)(ii) of this section, or a powered air purifying respirator as provided in subsection (2)(a)(i) of this section.

(c) The employer shall select respirators from among those approved for protection against dust, fume, and mist by the National Institute for Occupational Safety and Health (NIOSH) under the provisions of 30 CFR Part 11, except that not later than January 20, 1979, the employer shall select respirators from among those approved by NIOSH for protection against coke oven emissions.

(3) Respirator program. The employer shall institute a respiratory protection program in accordance with WAC 296-62-071.

(4) Respirator usage.

(a) The employer shall assure that the respirator issued to the employee exhibits minimum facepiece leakage and that the respirator is fitted properly.

(b) The employer shall allow each employee who uses a filter respirator to change the filter elements whenever an increase in breathing resistance is detected and shall maintain an adequate supply of filter elements for this purpose.

(c) The employer shall allow employees who wear respirators to wash their face and respirator facepiece to prevent skin irritation associated with respirator use.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 86-16-009 (Order 86-28), § 296-62-20011, filed 7/25/86. Statutory Authority: 49.17.040, 49.17.050, and 49.17.240. 81-16-015 (Order 81-20), § 296-62-20011, filed 7/27/81; Order 77-14, § 296-62-20011, filed 7/25/77.]

WAC 296-62-20013 Protective clothing and equipment. (1) Provision and Use. The employer shall provide and assure the use of appropriate protective clothing and equipment, such as but not limited to:

(a) Flame resistant jacket and pants;

(b) Flame resistant gloves;

(c) Face shields or vented goggles which comply with WAC 296-24-078;

(d) Footwear providing insulation from hot surfaces;

(e) Safety shoes which comply with WAC 296-24-088;

and

(f) Protective helmets which comply with WAC 296-24-084.

(2) Cleaning and Replacement.

(a) The employer shall provide the protective clothing required by subsection (1)(a) and (b) of this section in a clean and dry condition at least weekly.

(b) The employer shall clean, launder, or dispose of protective clothing required by subsections (1)(a) and (b) of this section.

(c) The employer shall repair or replace the protective clothing and equipment as needed to maintain their effectiveness.

(d) The employer shall assure that all protective clothing is removed at the completion of a work shift only in change rooms prescribed in WAC 296-62-20015.

(e) The employer shall assure that contaminated protective clothing which is to be cleaned, laundered, or disposed of, is placed in a closed container in the changeroom.

(f) The employer shall inform any person who cleans or launders protective clothing required by this section, of the potentially harmful effects of exposure to coke oven emissions.

[Order 77-14, § 296-62-20013, filed 7/25/77.]

WAC 296-62-20015 Hygiene facilities and practices.

(1) Change rooms. The employer shall provide clean change rooms equipped with storage facilities for street clothes and separate storage facilities for protective clothing and equipment whenever employees are required to wear protective clothing and equipment in accordance with WAC 296-62-20013.

(2) Showers.

(a) The employer shall assure that employees working in the regulated area shower at the end of the work shift.

(b) The employer shall provide shower facilities in accordance with WAC 296-24-12009.

(3) Lunchrooms. The employer shall provide lunchroom facilities which have a temperature controlled, positive pressure, filtered air supply, and which are readily accessible to employees working in the regulated area.

(4) Lavatories.

(a) The employer shall assure that employees working in the regulated area wash their hands and face prior to eating.

(b) The employer shall provide lavatory facilities in accordance with WAC 296-24-12007.

(5) Prohibition of activities in the regulated area.

(a) The employer shall assure that in the regulated area, food or beverages are not present or consumed, smoking products are not present or used, and cosmetics are not applied, except, that these activities may be conducted in the lunchrooms, change rooms and showers required under subsection (1)-(3) of this section.

(b) Drinking water may be consumed in the regulated area.

[Order 77-14, § 296-62-20015, filed 7/25/77.]

WAC 296-62-20017 Medical surveillance. (1) General requirements.

(a) Each employer shall institute a medical surveillance program for all employees who are employed in the regulated areas at least 30 days per year.

(b) This program shall provide each employee covered under subsection (1)(a) of this section with an opportunity for medical examinations in accordance with this section.

(c) The employer shall inform any employee who refuses any required medical examination of the possible health consequences of such refusal and shall obtain a signed statement from the employee indicating that the employee understands the risk involved in the refusal to be examined.

(d) The employer shall assure that all medical examinations and procedures are performed by or under the supervision of a licensed physician, and are provided without cost to the employee.

(2) Initial examinations. At the time of initial assignment to a regulated area or upon the institution of the medical surveillance program, the employer shall provide a medical examination including at least the following elements:

(a) A work history and medical history which shall include smoking history and the presence and degree of respiratory symptoms, such as breathlessness, cough, sputum production, and wheezing;

(b) A 14" x 17" posterior-anterior chest x-ray and International Labour Office UICC/Cincinnati (ILO U/C) rating;

(c) Pulmonary function tests including forced vital capacity (FVC) and forced expiratory volume at one second (FEV 1.0) with recording of type of equipment used;

(d) Weight;

(e) A skin examination;

(f) Urinalysis for sugar, albumin, and hematuria;

- (g) A sputum cytology examination; and
- (h) A urinary cytology examination.

(3) Periodic examinations.

(a) The employer shall provide the examinations specified in subsections (2)(a)-(f) of this section at least annually for employees covered under subsection (1)(a) of this section.

(b) The employer shall provide the examinations specified in subsection (2)(a)-(h) of this section at least semi-annually for employees 45 years of age or older or with five or more years employment in the regulated area.

(c) Whenever an employee who is 45 years of age or older or with five or more years employment in the regulated area transfers or is transferred from employment in a regulated area, the employer shall continue to provide the examinations specified in subsections (2)(a)-(h) of this section semi-annually, as long as that employee is employed by the same employer or a successor employer.

(d) Whenever an employee has not taken the examination specified in subsections (3)(a)-(c) of this section within the six months preceding the termination of employment, the employer shall provide such examinations to the employee upon termination of employment.

(4) Information provided to the physician. The employer shall provide the following information to the examining physician:

(a) A copy of this regulation and its Appendixes;

(b) A description of the affected employee's duties as they relate to the employee's exposure;

(c) The employee's exposure level or anticipated exposure level;

(d) A description of any personal protective equipment used or to be used; and

(e) Information from previous medical examinations of the affected employee which is not readily available to the examining physician.

(5) Physician's written opinion.

(a) The employer shall obtain a written opinion from the examining physician which shall include:

(i) The results of the medical examinations;

(ii) The physician's opinion as to whether the employee has any detected medical conditions which would place the employee at increased risk of material impairment of the employee's health from exposure to coke oven emissions;

(iii) Any recommended limitations upon the employee's exposure to coke oven emissions or upon the use of protective clothing or equipment such as respirators; and

(iv) A statement that the employee has been informed by the physician of the results of the medical examination and any medical conditions which require further explanation or treatment.

(b) The employer shall instruct the physician not to reveal in the written opinion specific findings or diagnoses unrelated to occupational exposure.

(c) The employer shall provide a copy of the written opinion to the affected employee.

[Order 77-14, § 296-62-20017, filed 7/25/77.]

WAC 296-62-20019 Employee information and training. (1) Training program.

(a) The employer shall institute a training program for employees who are employed in the regulated area and shall assure their participation.

(b) The training program shall be provided as of January 20, 1977, for employees who are employed in the regulated area at that time or at the time of initial assignment to a regulated area.

(c) The training program shall be provided at least annually for all employees who are employed in the regulated area, except that training regarding the occupational safety and health hazards associated with exposure to coke oven emissions and the purpose, proper use, and limitations of respiratory protective devices shall be provided at least quarterly until January 20, 1978.

(d) The training program shall include informing each employee of:

(i) The information contained in the substance information sheet for coke oven emissions (Appendix A);

(ii) The purpose, proper use, and limitations of respiratory protective devices required in accordance with WAC 296-62-20011.

(iii) The purpose for and a description of the medical surveillance program required by WAC 296-62-20017 including information on the occupational safety and health hazards associated with exposure to coke oven emissions;

(iv) A review of all written procedures and schedules required under WAC 296-62-20009; and

(v) A review of this standard.

(2) Access to training materials.

(a) The employer shall make a copy of this standard and its appendixes readily available to all employees who are employed in the regulated area.

(b) The employer shall provide all materials relating to the employee information and training program to the director.

[Order 77-14, § 296-62-20019, filed 7/25/77.]

WAC 296-62-20021 Precautionary signs and labels.

(1) General.

(a) The employer may use labels or signs required by other statutes, regulations or ordinances in addition to, or in combination with, signs and labels required by this section.

(b) The employer shall assure that no statement appears on or near any sign required by this section which contradicts or detracts from the effects of the required sign.

(c) The employer shall assure that signs required by this section are illuminated and cleaned as necessary so that the legend is readily visible.

(2) Signs.

(a) The employer shall post signs in the regulated area bearing the legends:

DANGER

CANCER HAZARD

AUTHORIZED PERSONNEL ONLY

NO SMOKING OR EATING

(b) In addition, not later than January 20, 1978, the employer shall post signs in the areas where the permissible exposure limit is exceeded bearing the legend:

RESPIRATOR REQUIRED

(3) Labels. The employer shall apply precautionary labels to all containers of protective clothing contaminated with coke oven emissions. The label shall bear the following legend:

CAUTION

CLOTHING CONTAMINATED WITH COKE

EMISSIONS

DO NOT REMOVE DUST BY BLOWING OR SHAKING

[Order 77-14, § 296-62-20021, filed 7/25/77.]

WAC 296-62-20023 Recordkeeping. (1) Exposure measurements. The employer shall establish and maintain an accurate record of all measurements taken to monitor employee exposure to coke oven emissions required in WAC 296-62-20007.

(a) This record shall include:

- (i) Name, social security number, and job classification of the employees monitored;
- (ii) The date(s), number, duration and results of each of the samples taken, including a description of the sampling procedure used to determine representative employee exposure where applicable;
- (iii) The type of respiratory protective devices worn, if any;
- (iv) A description of the sampling and analytical methods used and evidence of their accuracy; and
- (v) The environment variables that could affect the measurement of employee exposure.

(b) The employer shall maintain this record for at least 40 years or for the duration of employment plus 20 years, whichever is longer.

(2) Medical surveillance. The employer shall establish and maintain an accurate record for each employee subject to medical surveillance as required by WAC 296-62-20017.

(a) The record shall include:

- (i) The name, social security number, and description of duties of the employee;
- (ii) A copy of the physician's written opinion;
- (iii) The signed statement of any refusal to take a medical examination under WAC 296-62-20017; and
- (iv) Any employee medical complaints related to exposure to coke oven emissions.

(b) The employer shall keep, or assure that the examining physician keeps, the following medical records:

- (i) A copy of the medical examination results including medical and work history required under WAC 296-62-20017;
- (ii) A description of the laboratory procedures used and a copy of any standards or guidelines used to interpret the test results;
- (iii) The initial x-ray;
- (iv) The x-rays for the most recent 5 years;
- (v) Any x-ray with a demonstrated abnormality and all subsequent x-rays;

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(vi) The initial cytologic examination slide and written description;

(vii) The cytologic examination slide and written description for the most recent 10 years; and

(viii) Any cytologic examination slides with demonstrated atypia, if such atypia persists for 3 years, and all subsequent slides and written descriptions.

(c) The employer shall maintain medical records required under subsection (2) of this section for at least 40 years, or for the duration of employment plus 20 years, whichever is longer.

(3) Availability.

(a) The employer shall make available upon request all records required to be maintained by this section to the director for examination and copying.

(b) Employee exposure measurement records and employee medical records required by this subsection shall be provided upon request to employees, designated representatives, and the assistant director in accordance with WAC 296-62-05201 through 296-62-05209 and 296-62-05213 through 296-62-05217.

(c) The employer shall make available upon request employee medical records required to be maintained by subsection (2) of this section to a physician designated by the affected employee or former employee.

(4) Transfer of records.

(a) Whenever the employer ceases to do business, the successor employer shall receive and retain all records required to be maintained by this section.

(b) Whenever the employer ceases to do business and there is no successor employer to receive and retain the records for the prescribed period, these records shall be transmitted by registered mail to the director.

(c) At the expiration of the retention period for the records required to be maintained under subsections (1) and (2) of this section, the employer shall transmit these records by registered mail to the director or shall continue to retain such records.

(d) The employer shall also comply with any additional requirements involving transfer of records set forth in WAC 296-62-05215.

[Statutory Authority: RCW 49.17.040, 49.17.050 and 49.17.240. 81-18-029 (Order 81-21), § 296-62-20023, filed 8/27/81; Order 77-14, § 296-62-20023, filed 7/25/77.]

WAC 296-62-20025 Observation of monitoring. (1) Employee observation. The employer shall provide affected employees or their representatives an opportunity to observe any measuring or monitoring of employee exposure to coke oven emissions conducted pursuant to WAC 296-62-20007.

(2) Observation procedures.

(a) Whenever observation of the measuring or monitoring of employee exposure to coke oven emissions requires entry into an area where the use of protective clothing or equipment is required, the employer shall provide the observer with and assure the use of such equipment and shall require the observer to comply with all other applicable safety and health procedures.

(b) Without interfering with the measurement, observers shall be entitled to:

- (i) An explanation of the measurement procedures;

- (ii) Observe all steps related to the measurement of coke oven emissions performed at the place of exposure; and
- (iii) Record the results obtained.

[Order 77-14, § 296-62-20025, filed 7/25/77.]

WAC 296-62-20027 Appendix A—Coke oven emissions substance information sheet.

APPENDIX A

**COKE OVEN EMISSIONS
SUBSTANCE INFORMATION SHEET**

I. SUBSTANCE IDENTIFICATION

- (1) Substance: Coke oven emissions
- (2) Definition: The benzene-soluble fraction of total particulate matter present during the destructive distillation or carbonization of coal for the production of coke.
- (3) Permissible exposure limit: 150 micrograms per cubic meter of air determined as an average over an 8-hour period.
- (4) Regulated areas: Only employees authorized by your employer should enter a regulated area. The employer is required to designate the following areas as regulated areas: the coke oven battery, including topside and its machinery, pushside and its machinery, and the screening station; and the wharf, the beehive ovens and machinery.

II. HEALTH HAZARD DATA

Exposure to coke oven emissions is a cause of lung cancer, and possibly kidney cancer, in humans. Although it does not have an excess number of skin cancer cases in humans, repeated skin contact with coke oven emissions should be avoided.

III. PROTECTIVE CLOTHING AND EQUIPMENT

- (1) Respirators: Respirators will be provided by your employer for routine use if your employer is in the process of implementing engineering and work practice controls or where engineering and work practice controls are not feasible or insufficient. You must wear respirators for nonroutine activities or in emergency situations where you are likely to be exposed to levels of coke oven emissions in excess of the permissible exposure limit. Until January 20, 1978, the routine wearing of respirators is voluntary. Until that date, if you choose not to wear a respirator you do not have to do so. You must still have your respirator with you and you must still wear it if you are near visible emissions. Since how well your respirator fits your face is very important, your employer is required to conduct fit tests to make sure the respirator seals properly when you wear it. These tests are simple and rapid and will be explained to you during your training sessions.
- (2) Protective clothing: Your employer is required to provide, and you must wear, appropriate, clean, protec-

tive clothing and equipment to protect your body from repeated skin contact with coke oven emissions and from the heat generated during the coking process. This clothing should include such items as jacket and pants and flame resistant gloves. Protective equipment should include face shield or vented goggles, protective helmets and safety shoes, insulated from hot surfaces where appropriate.

IV. HYGIENE FACILITIES AND PRACTICES

You must not eat, drink, smoke, chew gum or tobacco, or apply cosmetics in the regulated area, except that drinking water is permitted. Your employer is required to provide lunchrooms and other areas for these purposes.

Your employer is required to provide showers, washing facilities, and change rooms. If you work in a regulated area, you must wash your face, and hands before eating. You must shower at the end of the work shift. Do not take used protective clothing out of the change rooms without your employer's permission. Your employer is required to provide for laundering or cleaning of your protective clothing.

V. SIGNS AND LABELS

Your employer is required to post warning signs and labels for your protection. Signs must be posted in regulated areas. The signs must warn that a cancer hazard is present, that only authorized employees may enter the area, and that no smoking or eating is allowed. In regulated areas where coke oven emissions are above the permissible exposure limit, the signs should also warn that respirators must be worn.

VI. MEDICAL EXAMINATIONS

If you work in a regulated area at least 30 days per year, your employer is required to provide you with a medical examination every year. The medical examination must include a medical history, a chest x-ray; pulmonary function test; weight comparison; skin examination; a urinalysis and a urine and sputum cytology exam for the early detection of urinary or lung cancer. The cytology exams are only included in the initial exam until you are either 45 years or older or have 5 or more years employment in the regulated areas when the medical exams including these tests are to be given every 6 months. The examining physician will provide a written opinion to your employer containing the results of the medical exams. You should also receive a copy of this opinion.

VII. OBSERVATION OF MONITORING

Your employer is required to monitor your exposure to coke oven emissions and you are entitled to observe the monitoring procedure. You are entitled to receive an explanation of the measurement procedure, observe the steps taken in the measurement procedure, and to record the results obtained. When the monitoring procedure is taking place in an area where respirators or personal protective clothing and equip-

ment are required to be worn, you must also be provided with and must wear the protective clothing and equipment.

VIII. ACCESS TO RECORDS

You or your representative are entitled to records of your exposure to coke oven emissions upon request to your employer. Your medical examination records can be furnished to your physician upon request to your employer.

IX. TRAINING AND EDUCATION

Additional information on all of these items plus training as to hazards of coke oven emissions and the engineering and work practice controls associated with your job will also be provided by your employer.

[Order 77-14, Appendix A (codified as WAC 296-62-20027), filed 7/25/77.]

WAC 296-62-20029 Appendix B—Industrial hygiene and medical surveillance guidelines.

APPENDIX B

INDUSTRIAL HYGIENE AND MEDICAL SURVEILLANCE GUIDELINES

I. INDUSTRIAL HYGIENE GUIDELINES

(1) Sampling. (Benzene-Soluble Fraction Total Particulate Matter.)

Samples collected should be full shift (8-hour) samples. Sampling should be done using a personal sampling pump with pulsation damper at a flow rate of 2 liters per minute. Samples should be collected on 0.8 micrometer pore size silver membrane filters (37 mm diameter) preceded by Gelman glass fiber type A filters encased in three-piece plastic (polystyrene) field monitor cassettes. The cassette face cap should be on and the plug removed. The rotameter should be checked every hour to ensure that proper flow rates are maintained.

A minimum of three full-shift samples should be collected for each job classification on each battery, at least one during and the night. If disparate results are obtained for particular job classification, sampling should be repeated. It is advisable to sample each shift on more than one day to account for environmental variables (wind, precipitation, etc.) which may affect sampling. Differences in exposures among different work shifts may indicate a need to improve work practices on a particular shift. Sampling results from different shifts for each job classification should not be averaged. Multiple samples from same shift may be used to calculate an average exposure for a particular job classification.

(2) Analysis.

(a) All extraction glassware is cleaned with dichromic acid cleaning solution, rinsed with tap water, then dionized water, acetone, and allowed to dry completely. The glassware is rinsed with nanograde benzene before

use. The Teflon cups are cleaned with benzene then with acetone.

(b) Pre-weigh the 2 ml Perkin-Elmer Teflon cups to one hundredth of a milligram on a Perkin-Elmer autobalance AD 2 Tare weight of the cups is about 50 mg.

(c) Place the silver membrane filter and glass fiber filter into a 15 ml test tube.

(d) Extract with 5 ml of benzene for five minutes in an ultrasonic cleaner.

(e) Filter the extract in 15 ml medium glass fritted funnels.

(f) Rinse test tube and filters with two 1.5 ml aliquots of benzene and filter through the fritted glass funnel.

(g) Collect the extract and two rinses in a 10 ml Kontes graduated evaporative concentrator.

(h) Evaporate down to a 1 ml while rinsing the sides with benzene.

(i) Pipet 0.5 ml into the Teflon cup and evaporate to dryness in a vacuum oven at 40° C for 3 hours.

(j) Weight the Teflon cup and the weight gain is due to the benzene soluble residue in half the sample.

II. MEDICAL SURVEILLANCE GUIDELINES

(1) General.

The minimum requirements for the medical examination for coke oven workers are given in WAC 296-62-20017.

The initial examination is to be provided to all coke oven workers at the time of the initial assignment to a job in the regulated area. The examination includes a 14" x 17" posterior-anterior chest x-ray and a ILO/UC rating to assure some standardization of x-ray reading, pulmonary function tests (FVC and FEV 1.0), weight, urinalysis, skin examination and a sputum and urinary cytologic examination. These tests are to serve as the baseline for comparing the employee's future test results. Periodic exams include all the elements of the initial exams except that the cytologic tests are to be performed only on those employees who are 45 years of age or older or who have worked for 5 or more years in the regulated area; periodic exams are to be performed semi-annually for this group instead of annually. The examination contents are minimum requirements, additional tests such as lateral and oblique x-rays or additional pulmonary function tests may be performed if deemed necessary.

(2) Pulmonary function tests.

Pulmonary function tests should be performed in a manner which minimizes subject and operator bias. There has been shown to be learning effects with regard to the results obtained from certain tests, such as FEV 1.0. Best results can be obtained by multiple trials for each subject. The best of three trials or the average of the last three of five trials may be used in obtaining reliable results. The type of equipment used (manufacturer, model, etc.) should be recorded with the results as reliability and accuracy varies and such information may be important in the evaluation of test results. Care

should be exercised to obtain the best possible testing equipment.

(3) Sputum cytology.

Sputum can be collected by aerosol inhalation during the medical exam or by spontaneous early morning cough at home. Sputum is induced by transoral inhalation of an aerosolized solution of eight per cent sodium chloride in water. After inhaling as few as three to five breaths the subject usually yields an adequate sputum specimen. A minimum of three samples should be collected by the subject at home. All sputum should be collected directly into sixty percent alcohol.

Scientific evidence suggests that chest x-rays and sputum cytology should be used together as screening tests for lung cancer in high risk populations, such as coke oven workers. The tests are to be performed every six months on workers who are 45 years of age or older or have worked in the regulated area for 5 or more years. Since the tests seem to be complementary, it may be advantageous to alternate the test procedures. For instance, chest x-rays could be obtained in June and December and sputum cytologies could be obtained in March and September. Facilities for providing necessary diagnostic investigation should be readily available as well as chest physicians, surgeons, radiologists, pathologists, and immunotherapists to provide any necessary treatment services.

[Order 77-14, Appendix B (codified as WAC 296-62-20029), filed 7/25/77.]

PART P—HAZARDOUS WASTE OPERATIONS AND EMERGENCY RESPONSE

WAC 296-62-300 Scope, application, and definitions. (1) Scope. This section covers employers who have employees who work in the following operations:

(a) Clean-up operations required by a governmental body, whether federal, state, local, or other involving hazardous substances that are conducted at uncontrolled hazardous waste sites (including, but not limited to, the EPA's National Priority Site List (NPL), state priority site lists, sites recommended for the EPA NPL, and initial investigations of government identified sites which are conducted before the presence or absence of hazardous substances has been ascertained);

(b) Corrective actions involving clean-up operations at sites covered by the Resource Conservation and Recovery Act of 1976 (RCRA) as amended (42 U.S.C. 6901 et seq.);

(c) Voluntary clean-up operations at sites recognized by federal, state, local, or other governmental bodies as uncontrolled hazardous waste sites;

(d) Operations involving hazardous wastes that are conducted at treatment, storage, and disposal (TSD) facilities regulated by 40 CFR Parts 264 and 265 pursuant to RCRA; or by agencies under agreement with U.S.E.P.A. to implement RCRA regulations; and

(e) Emergency response operations for releases of, or substantial threats of releases of, hazardous substances without regard to the location of the hazard.

(2) Application.

(a) All requirements of this chapter and chapters 296-24 and 296-155 WAC apply pursuant to their terms to hazardous waste and emergency response operations whether covered by this part or not. If there is a conflict or overlap, the provision more protective of employee safety and health shall apply.

(b) Hazardous substance clean-up operations within the scope of subsection (1)(a), (b), and (c) of this section must comply with all sections of this part except WAC 296-62-3112 and 296-62-3140.

(c) Operations within the scope of subsection (1)(d) of this section must comply only with the requirements of WAC 296-62-3140.

Notes and Exceptions:

(i) All provisions of WAC 296-62-3140 cover any treatment, storage, or disposal (TSD) operation regulated by 40 CFR parts 264 and 265 or by state law authorized under RCRA, and required to have a permit or interim status from EPA pursuant to 40 CFR 270.1 or from a state agency pursuant to RCRA.

(ii) Employers who are not required to have a permit or interim status because they are conditionally exempt small quantity generators under 40 CFR 261.5 or are generators who qualify under 40 CFR 262.34 for exemptions from regulation under 40 CFR parts 264, 265, and 270 ("excepted employers") are not covered by WAC 296-62-3140 (1) through (7). Excepted employers who are required by the EPA or state agency to have their employees engage in emergency response or who direct their employees to engage in emergency response are covered by WAC 296-62-3140(8), and cannot be exempted by WAC 296-62-3140 (8)(a). Excepted employers who are not required to have employees engage in emergency response, who direct their employees to evacuate in the case of such emergencies and who meet the requirements of WAC 296-62-3140 (8)(a) are exempt from the balance of WAC 296-62-3140(8).

(iii) If an area is used primarily for treatment, storage or disposal, any emergency response operations in that area shall comply with WAC 296-62-3140(8). In other areas not used primarily for treatment, storage or disposal, any emergency response operations shall comply with WAC 296-62-3112. Compliance with the requirements of WAC 296-62-3112 shall be deemed to be in compliance with the requirements of WAC 296-62-3140(8).

(d) Emergency response operations for releases of, or substantial threats of releases of hazardous substances which are not covered by subsection (1)(a) through (d) of this section must only comply with the requirements of WAC 296-62-3112.

(3) Definitions.

(a) "Buddy system" means a system of organizing employees into work groups in such a manner that each employee of the work group is designated to be observed by at least one other employee in the work group. The purpose of the buddy system is to provide rapid assistance to employees in the event of an emergency.

(b) "Clean-up operation" means an operation where hazardous substances are removed, contained, incinerated, neutralized, stabilized, cleared-up, or in any other manner

processed or handled with the ultimate goal of making the site safer for people or the environment.

(c) "Contamination reduction zone" means the buffer between the exclusion zone and the outermost clean zone.

(d) "Decontamination" means the removal of hazardous substances from employees and their equipment to the extent necessary to preclude the occurrence of foreseeable adverse health effects.

(e) "Emergency response" or "responding to emergencies" means a response effort by employees from outside the immediate release area or by other designated responders (i.e., mutual aid groups, local fire departments, etc.) to an occurrence which results, or is likely to result, in an uncontrolled release of a hazardous substance. Responses to incidental releases of hazardous substances where the substance can be absorbed, neutralized, or otherwise controlled at the time of release by employees in the immediate release area or by maintenance personnel are not considered to be emergency responses within the scope of this standard. Responses to release of hazardous substances where there is no potential safety or health hazard (i.e., fire, explosion, or chemical exposure) are not considered to be emergency responses.

(f) "Exclusion zone" means the innermost zone at a site where contamination does occur.

(g) "Facility" means (i) any building structure, installation, equipment, pipe or pipeline (including any pipe into a sewer or publicly-owned treatment works), well, pit, pond, lagoon, impoundment, ditch, storage container, motor vehicle, rolling stock, or aircraft, or (ii) any site or area where a hazardous substance has been deposited, stored, disposed of, or placed, or otherwise come to be located; but does not include any consumer product in consumer use or any water-borne vessel.

(h) "Hazardous materials response (HAZMAT) team" means an organized group of employees, designated by the employer, who are expected to perform work, to handle and control actual or potential leaks or spills of hazardous substances requiring possible close approach to the substance. The team members perform responses to releases or potential releases of hazardous substances for the purpose of control or stabilization of the incident. A HAZMAT team is not a fire brigade nor is a typical fire brigade a HAZMAT team. A HAZMAT team, however, may be a separate component of a fire brigade or fire department.

(i) "Hazardous substance" means any substance designated or listed under (i)(i) through (iv) of this subsection, exposure to which results or may result in adverse effects on the health or safety of employees:

(i) Any substance defined under section 101(14) of CERCLA;

(ii) Any biological agent and other disease-causing agent which after release into the environment and upon exposure, ingestion, inhalation, or assimilation into any person, either directly from the environment or indirectly by ingestion through food chains, will or may reasonably be anticipated to cause death, disease, behavioral abnormalities, cancer, genetic mutation, physiological malfunctions (including malfunctions in reproduction) or physical deformations in such persons or their offspring;

(iii) Any substance listed by the United States Department of Transportation as hazardous materials under WAC 480-12-195; and

(iv) Hazardous waste as herein defined.

(j) "Hazardous waste" means:

A waste or combination of wastes as defined in (m) of this subsection.

(k) "Hazardous waste operation" means any operation conducted within the scope of this standard.

(l) "Hazardous waste site" or "site" means any facility or location within the scope of this standard at which hazardous waste operations take place.

(m) "Health hazard" means a chemical, mixture of chemicals, or a pathogen for which there is statistically significant evidence based on at least one study conducted in accordance with established scientific principles that acute or chronic health effects may occur in exposed employees. The term "health hazard" includes chemicals which are carcinogens, toxic or highly toxic agents, reproductive toxins, irritants, corrosives, sensitizers, hepatotoxins, nephrotoxins, neurotoxins, agents which act on the hematopoietic system, and agents which damage the lungs, skin, eyes, or mucous membranes. It also includes stress due to temperature extremes. Further definition of the terms used above can be found in Appendix A to chapter 296-62 WAC, Part C.

(n) "IDLH" or "immediately dangerous to life or health" means any atmospheric concentration of any toxic, corrosive, or asphyxiant substance that poses an immediate threat to life or would cause irreversible or delayed adverse health effects or would interfere with an individual's ability to escape from a dangerous atmosphere.

(o) "Oxygen deficiency" means that concentration of oxygen by volume below which atmosphere supplying respiratory protection must be provided. It exists in atmospheres where the percentage of oxygen by volume is less than 19.5 percent oxygen.

(p) "Permissible exposure limit" means the exposure, inhalation, or dermal permissible limit specified in WAC 296-62-075 through 296-62-07515.

(q) "Published exposure level" means the exposure limits published in "NIOSH Recommendations for Occupational Health Standards" dated 1986 incorporated by reference, or if none is specified, the exposure limits published in the standards specified by the American Conference of Governmental Industrial Hygienists in their publication "Threshold Limit Values and Biological Exposure Indices for 1988-89" dated 1988 incorporated by reference.

(r) "Post emergency response" means that portion of an emergency response performed after the immediate threat of a release has been stabilized or eliminated and clean-up of the site has begun. If post emergency response is performed by an employer's own employees who were part of the initial emergency response, it is considered to be part of the initial response and not post emergency response. However, if a group of an employer's own employees, separate from the group providing initial response, performs the clean-up operation, then the separate group of employees would be considered to be performing post-emergency response and subject to WAC 296-62-3112(11).

(s) "Qualified person" means a person with specific training, knowledge, and experience in the area for which the person has responsibility and the authority to control.

(t) "Site safety and health supervisor (or official)" means the individual located on a hazardous waste site who is responsible to the employer and has the authority and knowledge necessary to implement the site safety and health plan and verify compliance with applicable safety and health requirements.

(u) "Site work zones" means an exclusion zone, contamination reduction zone, and a clean zone established at a hazardous waste site before clean-up work begins to prevent or reduce the movement of contaminants from the site to uncontaminated areas and to control public, employee, and equipment exposure to hazardous substances.

(i) The exclusion zone is the innermost of the zones and is where contamination does occur. The contamination reduction zone is the zone between the exclusion zone and the clean zone and serves as a transition and buffer between the contaminated and clean zone to further reduce the physical transfer of contaminating substances to the public, employees, and equipment. The clean zone is the outermost of the zones and is a noncontaminated or clean area. The level of contamination in these zones is not defined and some designated exclusion zones can have very little contamination directly affecting employees.

(ii) The contaminated reduction corridors are the designated areas within the contaminated reduction zone for the decontamination of personnel and equipment.

(v) "Small quantity generator" means a generator of hazardous wastes who in any calendar month generates no more than 1000 kilograms (2205 pounds) of hazardous waste in that month.

(w) "Uncontrolled hazardous waste site" means an area identified as an uncontrolled hazardous waste site by a governmental body, whether federal, state, local, or other where an accumulation of hazardous substances creates a threat to the health and safety of individuals or the environment or both. Some sites are found on public lands, such as those created by former municipal, county, or state landfills where illegal or poorly managed waste disposal has taken place. Other sites are found on private property, often belonging to generators or former generators of hazardous substance waste. Examples of such sites include, but are not limited to, surface impoundments, landfills, dumps, and tank or drum farms. Normal operations at TSD sites are not covered by this definition.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-62-300, filed 7/20/94, effective 9/20/94; 91-24-017 (Order 91-07), § 296-62-300, filed 11/22/91, effective 12/24/91; 90-20-091 (Order 90-14), § 296-62-300, filed 10/1/90, effective 11/15/90; 89-21-018 (Order 89-10), § 296-62-300, filed 10/10/89, effective 11/24/89; 88-21-002 (Order 88-23), § 296-62-300, filed 10/6/88, effective 11/7/88.]

WAC 296-62-3010 Safety and health program.

Note: Safety and health programs developed and implemented to meet other federal, state, or local regulations are considered acceptable in meeting this requirement if they cover or are modified to cover the topics required in this section. An additional or separate safety and health program is not required by this section.

(1) General.

(a) Employers shall develop and implement a written safety and health program for their employees involved in hazardous waste operations. The program shall be designed to identify, evaluate, and control safety and health hazards and provide for emergency response for hazardous waste operations.

(b) The written safety and health program shall incorporate the following:

(i) An organizational structure;

(ii) A comprehensive workplan;

(iii) A site-specific safety and health plan which need not repeat the employer's standard operating procedures required in (b)(vi) of this subsection;

(iv) The safety and health training program;

(v) The medical surveillance program;

(vi) The employer's standard operating procedures for safety and health; and

(vii) Any necessary interface between general program and site specific activities.

(c) Site excavation. Site excavations created during initial site preparation or during hazardous waste operations shall be shored or sloped as appropriate to prevent accidental collapse in accordance with subpart N of chapter 296-155 WAC.

(d) Contractors and subcontractors. An employer who retains contractor or subcontractor services for work in hazardous waste operations shall inform those contractors, subcontractors, or their representatives of the site emergency response procedures and any potential fire, explosion, health, safety, or other hazards of the hazardous waste operation that have been identified by the employer, including those identified in the employer's information program.

(e) Program availability. The written safety and health program shall be made available to any contractor or subcontractor or their representative who will be involved with the hazardous waste operation; to employees; to employee designated representatives; to WISHA personnel, and to personnel of other federal, state, or local agencies with regulatory authority over the site.

(2) Organizational structure part of the site program.

(a) The organizational structure part of the program shall establish the specific chain of command and specify the overall responsibilities of supervisors and employees. It shall include at a minimum, the following elements:

(i) A general supervisor who has the responsibility and authority to direct all hazardous waste operations.

(ii) A site safety and health supervisor who has the responsibility and authority to develop and implement the site safety and health plan and verify compliance.

(iii) All other personnel needed for hazardous waste site operations and emergency response and their general functions and responsibilities.

(iv) The lines of authority, responsibility, and communication.

(b) The organizational structure shall be reviewed and updated as necessary to reflect the current status of waste site operations.

(3) Comprehensive workplan part of the site program. The comprehensive workplan shall address the tasks and

objectives of site operations and the logistics and resources required to reach those tasks and objectives.

(a) The comprehensive workplan shall address anticipated clean-up activities as well as normal operating procedures which need not repeat the employers procedures available elsewhere.

(b) The comprehensive workplan shall define work tasks and objectives and identify the methods for accomplishing those tasks and objectives.

(c) The comprehensive workplan shall establish personnel requirements for implementing the plan.

(d) The comprehensive workplan shall provide for the implementation of the training required in WAC 296-62-3040.

(e) The comprehensive workplan shall provide for the implementation of the required informational programs required in WAC 296-62-3080.

(f) The comprehensive workplan shall provide for the implementation of the medical surveillance program described in WAC 296-62-3050.

(4) Site-specific safety and health plan part of the program.

(a) General. The site safety and health plan, which must be kept on site, shall address the safety and health hazards of each phase of site operation; and include the requirements and procedures for employee protection.

(b) Elements. The site safety and health plan, as a minimum, shall address the following:

(i) Names of key personnel and alternates responsible for site safety and health, including a site safety and health supervisor.

(ii) A safety and health risk or hazard analysis for each site task and operation found in the workplan.

(iii) Employee training assignments to assure compliance with WAC 296-62-3040.

(iv) Personal protective equipment to be used by employees for each of the site tasks and operations being conducted as required by the personal protective equipment program in WAC 296-62-3060(5).

(v) Medical surveillance requirements in accordance with the program in WAC 296-62-3050.

(vi) Frequency and types of air monitoring, personnel monitoring, and environmental sampling techniques and instrumentation to be used, including methods of maintenance and calibration of monitoring and sampling equipment to be used.

(vii) Site control measures in accordance with the site control program required in WAC 296-62-3030.

(viii) Decontamination procedures in accordance with WAC 296-62-3100.

(ix) An emergency response plan meeting the requirements of WAC 296-62-3110 for safe and effective responses to emergencies, including the necessary PPE and other equipment.

(x) Confined space and permit-required confined space entry procedures as addressed in chapter 296-62 WAC, Part M.

(xi) A spill containment program meeting the requirements of WAC 296-62-3090.

(c) Preentry briefing. The site specific safety and health plan shall provide for preentry briefings to be held prior to

initiating any site activity, and at such other times as necessary to ensure that employees are apprised of the site safety and health plan and that this plan is being followed. The information and data obtained from site characterization and analysis work required in WAC 296-62-3020 shall be used to prepare and update the site safety and health plan.

(d) Effectiveness of site safety and health plan. Inspections shall be conducted by the site safety and health supervisor or, in the absence of that individual, another individual who is knowledgeable in occupational safety and health acting on behalf of the employer as necessary to determine the effectiveness of the site safety and health plan. Any deficiencies in the effectiveness of the site safety and health plan shall be corrected by the employer.

[Statutory Authority: Chapter 49.17 RCW. 95-04-007, § 296-62-3010, filed 1/18/95, effective 3/1/95; 89-21-018 (Order 89-10), § 296-62-3010, filed 10/10/89, effective 11/24/89; 88-21-002 (Order 88-23), § 296-62-3010, filed 10/6/88, effective 11/7/88.]

WAC 296-62-3020 Site characterization and analysis. (1) General. Hazardous waste sites shall be evaluated in accordance with this section to identify specific site hazards and to determine the appropriate safety and health control procedures needed to protect employees from the identified hazards.

(2) Preliminary evaluation. A preliminary evaluation of a site's characteristics shall be performed prior to site entry by a qualified person in order to aid in the selection of appropriate employee protection methods prior to site entry. Immediately after initial site entry, a more detailed evaluation of the site's specific characteristics shall be performed by a qualified person in order to further identify existing site hazards and to further aid in the selection of the appropriate engineering controls and personal protective equipment for the tasks to be performed.

(3) Hazard identification. All suspected conditions that may pose inhalation or skin absorption hazards that are immediately dangerous to life or health (IDLH), or other conditions that may cause death or serious harm, shall be identified during the preliminary survey and evaluated during the detailed survey. Examples of such hazards include, but are not limited to, confined space entry, potentially explosive or flammable situations, visible vapor clouds, or areas where biological indicators such as dead animals or vegetation are located.

(4) Required information. The following information to the extent available shall be obtained by the employer prior to allowing employees to enter a site:

- (a) Location and approximate size of the site.
- (b) Description of the response activity and/or the job task to be performed.
- (c) Duration of the planned employee activity.
- (d) Site topography and accessibility by air and roads.
- (e) Safety and health hazards expected at the site.
- (f) Pathways for hazardous substance dispersion.
- (g) Present status and capabilities of emergency response teams that would provide assistance to hazardous waste clean-up site employees at the time of an emergency.
- (h) Hazardous substances and health hazards involved or expected at the site and their chemical and physical properties.

(5) Personal protective equipment. Personal protective equipment (PPE) shall be provided and used during initial site entry in accordance with the following requirements:

(a) Based upon the results of the preliminary site evaluation, an ensemble of PPE shall be selected and used during initial site entry which will provide protection to a level of exposure below established permissible exposure limits and published exposure levels for known or suspected hazardous substances and health hazards, and which will provide protection against other known and suspected hazards identified during the preliminary site evaluation. If there is no permissible exposure limit or published exposure level, the employer may use other published studies and information as a guide to appropriate personal protective equipment. Level A and Level B personal protective equipment is required for the most hazardous actual or potential exposures.

(b) If positive-pressure self-contained breathing apparatus is not used as part of the entry ensemble, and if respiratory protection is warranted by the potential hazards identified during the preliminary site evaluation, an escape self-contained breathing apparatus of at least five minute's duration shall be carried by employees during initial site entry.

(c) If the preliminary site evaluation does not produce sufficient information to identify the hazards or suspected hazards of the site an ensemble providing protection equivalent to Level B PPE shall be provided as minimum protection and direct reading instruments shall be used as appropriate for identifying IDLH conditions. (See WAC 296-62-3170 - Appendix B for a description of Level B hazards and the recommendations for Level B protective equipment.)

(d) Once the hazards of the site have been identified, the appropriate PPE shall be selected and used in accordance with WAC 296-62-3060.

(6) Monitoring. The following monitoring shall be conducted during initial site entry when the site evaluation produces information that shows the potential for ionizing radiation or IDLH conditions, or when the site information is not sufficient to rule out these possible conditions:

(a) Monitoring with direct reading instruments for hazardous levels of ionizing radiation.

(b) Monitoring the air with appropriate direct reading equipment (i.e., combustible gas meters, detector tubes) for IDLH and other conditions that may cause death or serious harm (combustible or explosive atmospheres, oxygen deficiency, toxic substances).

(c) Visually observing for signs of actual or potential IDLH or other dangerous conditions.

(d) An ongoing air monitoring program in accordance with WAC 296-62-3070 shall be implemented after site characterization has determined the site is safe for the start-up of operations.

(7) Risk identification. Once the presence and concentrations of specific hazardous substances and health hazards have been established, the risks associated with these substances shall be identified. Employees who will be working on the site shall be informed of any risks that have been identified. In situations covered by chapter 296-62 WAC, Part C, training required by those standards need not be duplicated.

Note: Risks to consider include, but are not limited to:

- (a) Exposures exceeding the permissible exposure limits and published exposure levels.
- (b) IDLH concentrations.
- (c) Potential skin absorption and irritation sources.
- (d) Potential eye irritation sources.
- (e) Explosion sensitivity and flammability ranges.
- (f) Oxygen deficiency.

(8) Employee notification. Any information concerning the chemical, physical, and toxicologic properties of each substance known or expected to be present on site that is available to the employer and relevant to the duties an employee is expected to perform shall be made available to all employees prior to the commencement of their work activities. The employer may utilize information developed for the hazard communication standard, chapter 296-62 WAC, Part C, for this purpose.

[Statutory Authority: Chapter 49.17 RCW. 94-16-145, § 296-62-3020, filed 8/3/94, effective 9/12/94; 90-20-091 (Order 90-14), § 296-62-3020, filed 10/1/90, effective 11/15/90; 89-21-018 (Order 89-10), § 296-62-3020, filed 10/10/89, effective 11/24/89; 88-21-002 (Order 88-23), § 296-62-3020, filed 10/6/88, effective 11/7/88.]

WAC 296-62-3030 Site control. (1) General. Appropriate site control procedures shall be implemented to control employee exposure to hazardous substances before clean-up work begins.

(2) Site control program. A site control program for protecting employees which is part of the employer's site safety and health program required in WAC 296-62-3010 shall be developed during the planning stages of a hazardous waste clean-up operation and modified as necessary as new information becomes available.

(3) Elements of the site control program. The site control program shall, as a minimum, include: A site map; site work zones; the use of a "buddy system"; site communications including alerting means for emergencies; the standard operating procedures or safe work practices; and, identification of nearest medical assistance. Where these requirements are covered elsewhere they need not be repeated.

(4) Site work zones.

(a) The site work zones shall be the exclusion zone, contamination reduction zone, and the clean zone.

(b) Decontamination procedures shall take place in the contamination reduction corridor consisting, if practical, of separate corridors for personnel and for equipment.

(c) An entry and exit check point must be established at the boundary of the exclusion zone to regulate the flow of personnel and equipment into and out of the zone. Exit from the exclusion zone must be through a contamination reduction corridor.

(d) Access to the contamination reduction zone from the clean zone is through a control point. Personnel entering or working in the contamination zone shall wear the prescribed personnel protective equipment, if required, for working in this zone. Entering the clean zone requires removal of any protective equipment worn in the contamination reduction zone.

[Statutory Authority: Chapter 49.17 RCW. 89-21-018 (Order 89-10), § 296-62-3030, filed 10/10/89, effective 11/24/89; 88-21-002 (Order 88-23), § 296-62-3030, filed 10/6/88, effective 11/7/88.]

[Statutory Authority: Chapter 49.17 RCW. 91-03-044 (Order 90-18), § 296-115-070, filed 1/10/91, effective 2/12/91. Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 42.30 and 43.22 RCW. 80-17-014 (Order 80-20), § 296-115-070, filed 11/13/80.]

WAC 296-115-100 Violations and setting of penalties. (1) Violations of the mandatory provisions of this chapter shall be subject to penalty. The amount of the penalty will be assessed in accordance with the guidelines and fixed schedules contained herein.

(2) Fixed schedule penalties.

(a) Failure to display certificate of inspection as required: Fifty dollars to owner of the vessel.

(b) Operation of vessel in passenger service without a valid certificate of inspection: To owner of vessel, two hundred dollars per violation; to person who operates vessel, one hundred dollars per violation.

(c) Operation of vessel in passenger service while not in possession of valid USCG/state of Washington operator's license: One hundred dollars per violation to owner of vessel.

[Statutory Authority: Chapter 49.17 RCW. 91-03-044 (Order 90-18), § 296-115-100, filed 1/10/91, effective 2/12/91. Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 42.30 and 43.22 RCW. 80-17-014 (Order 80-20), § 296-115-100, filed 11/13/80.]

WAC 296-115-120 Annual fee schedule. (1) The annual license fee for passenger vessels or barges is \$250.00 plus \$2.00 per ton for each vessel.

(2) The fee for an operator's license for passenger vessels or barges is \$50.00 for the first year; this covers application and test costs. The renewal fee is \$25.00 annually.

(3) Additional inspection service when required is at the rate of \$25.00 per hour, plus travel and per diem.

[Statutory Authority: Chapter 49.17 RCW. 89-21-018 (Order 89-10), § 296-115-120, filed 10/10/89, effective 11/24/89. Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 42.30 and 43.22 RCW. 80-17-014 (Order 80-20), § 296-115-120, filed 11/13/80.]

Chapter 296-116 WAC PILOTAGE RULES

WAC

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296-116-300	Pilotage rates for the Puget Sound pilotage district.
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296-116-360	Exempt vessels.
296-116-370	System of specified disciplinary or corrective actions.
296-116-400	Procedure for request by steamship company or agent that certain pilots not be assigned to certain vessels for specific safety reasons.
296-116-410	Definition of Grays Harbor pilotage district.
296-116-420	Summary/temporary license suspension.
296-116-500	Tug escort requirements for oil tankers.

DISPOSITION OF SECTIONS FORMERLY CODIFIED IN THIS CHAPTER

296-116-040	Quorum defined. [Statutory Authority: RCW 88.16.035 and 88.16.155. 78-09-057 (Order 78-2, Resolution No. 78-2), § 296-116-040, filed 8/23/78; Order 2-68, § 296-116-040, filed 11/1/68; § 4, effective 11/25/58.] Repealed by 80-03-081 (Order 79-6, Resolution No. 79-6), filed 3/4/80. Statutory Authority: RCW 88.16.035.
296-116-090	Examination of pilots (Puget Sound and adjacent inland waters). [Order 76-12, § 296-116-090, filed 4/22/76; Order 74-33, § 296-116-090, filed 7/10/74; Order 69-4, § 296-116-090, filed 7/18/69; Order 2-68, § 296-116-090, filed 11/1/68; § 9, effective 11/25/58.] Repealed by 80-03-081 (Order 79-6, Resolution No. 79-6), filed 3/4/80. Statutory Authority: RCW 88.16.035.
296-116-095	Examination of pilots (Grays Harbor or Willapa Bay). [Order 76-12, § 296-116-095, filed 4/22/76; Order 73-6, § 296-116-095, filed 5/11/73; Order 2-68, § 296-116-095, filed 11/1/68; Rule 2-67 (part), filed 8/3/67, effective 9/5/67; Emergency Rule 1-67, filed 6/8/67.] Repealed by 80-03-081 (Order 79-6, Resolution No. 79-6), filed 3/4/80. Statutory Authority: RCW 88.16.035.
296-116-100	Details and requirements of new applications (Puget Sound and adjacent inland waters). [Order 76-12, § 296-116-100, filed 4/22/76; Order 74-33, § 296-116-100, filed 7/10/74; Order 69-4, § 296-116-100, filed 7/18/69; Order 2-68, § 296-116-100, filed 11/1/68; § 10, subsection 2, filed 7/18/61, 10/23/61, remainder of § 10, effective 11/25/58.] Repealed by 80-03-081 (Order 79-6, Resolution No. 79-6), filed 3/4/80. Statutory Authority: RCW 88.16.035.
296-116-105	Details and requirements of new applications (Grays Harbor or Willapa Bay). [Order 76-12, § 296-116-105, filed 4/22/76; Order 73-6, § 296-116-105, filed 5/11/73; Order 2-68, § 296-116-105, filed 11/1/68.] Repealed by 80-03-081 (Order 79-6, Resolution No. 79-6), filed 3/4/80. Statutory Authority: RCW 88.16.035.
296-116-130	Period of incapacitation. [Statutory Authority: RCW 88.16.035. 80-03-081 (Order 79-6, Resolution No. 79-6), § 296-116-130, filed 3/4/80; Order 2-68, § 296-116-130, filed 11/1/68; § 13, effective 11/25/58.] Repealed by 90-13-077, filed 6/19/90, effective 7/20/90. Statutory Authority: RCW 88.16.090.
296-116-160	Mileage on Puget Sound and adjacent inland waters. [Order 73-6, § 296-116-160, filed 5/11/73; Order 2-68, § 296-116-160, filed 11/1/68; § 16, effective 11/25/58.] Repealed by 80-03-081 (Order 79-6, Resolution No. 79-6), filed 3/4/80. Statutory Authority: RCW 88.16.035.
296-116-180	Tariffs, Puget Sound and adjacent inland waters. [Order 2-68, § 296-116-180, filed 11/1/68; § 18, effective 11/25/58.] Repealed by 80-03-081 (Order 79-6, Resolution No. 79-6), filed 3/4/80. Statutory Authority: RCW 88.16.035.
296-116-190	Hearings. [Order 2-68, § 296-116-190, filed 11/1/68.] Repealed by 80-03-081 (Order 79-6, Resolution No. 79-6), filed 3/4/80. Statutory Authority: RCW 88.16.035.
296-116-210	Annual report. [Order 2-68, § 296-116-210, filed 11/1/68; § 21, effective 11/25/58.] Repealed by 80-03-081 (Order

- 79-6, Resolution No. 79-6), filed 3/4/80. Statutory Authority: RCW 88.16.035.
- 296-116-220 Effective date and validity. [Order 2-68, § 296-116-220, filed 11/1/68; § 22, effective 11/25/58.] Repealed by 80-03-081 (Order 79-6, Resolution No. 79-6), filed 3/4/80. Statutory Authority: RCW 88.16.035.
- 296-116-310 Puget Sound pilots transportation schedule. [Order 77-18, § 296-116-310, filed 9/20/77, effective 11/1/77; Order 76-24, § 296-116-310, filed 7/22/76; Order 73-8, § 296-116-310, filed 6/20/73 and Emergency Order 73-10, filed 7/19/73, effective 8/14/73; Order 70-7, § 296-116-310, filed 7/16/70; 7/25/67; 2/18/64.] Repealed by 80-03-081 (Order 79-6, Resolution No. 79-6), filed 3/4/80. Statutory Authority: RCW 88.16.035.
- 296-116-320 Retirement fund contribution. [Statutory Authority: RCW 88.16.035. 83-05-049 (Order 83-2, Resolution No. 83-2), § 296-116-320, filed 2/16/83; 82-13-087 (Order 82-10-049, Resolution No. 82-10-049), § 296-116-320, filed 6/23/82; 80-03-081 (Order 79-6, Resolution No. 79-6), § 296-116-320, filed 3/4/80. Statutory Authority: Chapter 88.16 RCW and 1977 ex. sess. c 337, §§ 1 and 4. 78-02-008 (Order 78-1), § 296-116-320, filed 1/6/78, effective 2/10/78; Order 77-18, § 296-116-320, filed 9/20/77, effective 11/1/77; Order 76-24, § 296-116-320, filed 7/22/76; Order 76-12, § 296-116-320, filed 4/22/76; Order 73-8, § 296-116-320, filed 6/20/73 and Emergency Order 73-10, filed 7/19/73, effective 8/14/73; Order 70-7, § 296-116-320, filed 7/16/70; 7/25/67.] Repealed by 88-10-039 (Order 88-11, Resolution No. 88-11), filed 5/3/88. Statutory Authority: RCW 88.16.035.
- 296-116-330 Marine pilot—Trip insurance. [Statutory Authority: RCW 88.16.117. 83-03-037 (Order 83-1, Resolution No. 83-1), § 296-116-330, filed 1/17/83.] Repealed by 84-11-041 (Order 84-3, Resolution No. 84-3), filed 5/16/84. Statutory Authority: RCW 88.16.035(1).
- 296-116-350 Tariff, Grays Harbor and Willapa Bay pilots. [Order 71-4, § 296-116-350, filed 5/11/71, effective 6/15/71; Order 2-67 (part), filed 8/3/67, effective 9/5/67; Emergency Rule 1-67, filed 6/8/67.] Repealed by Order 75-1, filed 1/14/75.
- 296-116-351 Pilotage rates for Grays Harbor and Willapa Bay pilotage district. [Statutory Authority: RCW 88.16.035. 79-05-023 (Order 79-2, Resolution No. 79-2), § 296-116-351, filed 4/17/79; Statutory Authority: RCW 88.16.005 and 88.16.035. 79-02-030 (Order 79-1, Resolution No. 79-1), § 296-116-351, filed 1/19/79; 78-02-008 (Order 78-1), § 296-116-351, filed 1/6/78, effective 2/10/78; Order 75-1, § 296-116-351, filed 1/14/75.] Repealed by 80-03-081 (Order 79-6, Resolution No. 79-6), filed 3/4/80. Statutory Authority: RCW 88.16.035.

WAC 296-116-010 Time and place of meeting. The regular monthly meeting of the board of pilotage commissioners shall be on the second Thursday of each month at 9:00 a.m. at Pier 52, Seattle, Washington in the offices of the Washington state ferries unless another time and place has been designated by the chairperson at the last previous meeting. If the aforementioned day falls on a holiday, the meeting shall take place on the following Thursday at the same hour.

[Statutory Authority: RCW 88.16.035 and 88.16.155. 78-09-057 (Order 78-2, Resolution No. 78-2), § 296-116-010, filed 8/23/78; Order 2-68, § 296-116-010, filed 11/1/68; § 1, effective 11/25/58.]

WAC 296-116-020 Special meeting. A special meeting of the board of pilotage commissioners may be called by the presiding officer, or by a majority of the members of the board, by delivering personally or by mail written notice to all other members of the board at least twenty-four hours before the time of such meeting as specified in the notice. The notice calling a special meeting

shall state the purpose for which the meeting is called and the date, hour, and place of such meeting and all provisions of chapter 42.30 RCW shall apply.

[Statutory Authority: RCW 88.16.035. 88-09-025 (Order 88-3, Resolution No. 88-3), § 296-116-020, filed 4/14/88. Statutory Authority: RCW 88.16.035 and 88.16.155. 78-09-057 (Order 78-2, Resolution No. 78-2), § 296-116-020, filed 8/23/78; Order 2-68, § 296-116-020, filed 11/1/68; § 2, effective 11/25/58.]

WAC 296-116-030 Emergency meeting. If, by reason of an emergency, there is a need for expedited action by the board to meet the emergency, the presiding officer may provide for a meeting site, and the notice requirements of chapter 42.30 RCW shall be suspended during such emergency. To the extent possible, notice of such emergency meeting will be delivered personally, by telephone, telegram, or mail to the members of the board and interested persons, and shall specify the time and place of the emergency meeting and the business to be transacted. Any action taken by the board at such emergency meeting may be reconsidered by the board at its next regular monthly meeting.

[Statutory Authority: RCW 88.16.035. 88-09-026 (Order 88-4, Resolution No. 88-4), § 296-116-030, filed 4/14/88. Statutory Authority: RCW 88.16.035 and 88.16.155. 78-09-057 (Order 78-2, Resolution No. 78-2), § 296-116-030, filed 8/23/78; Order 2-68, § 296-116-030, filed 11/1/68; § 3, effective 11/25/58.]

WAC 296-116-050 Records. The board of pilotage commissioners shall keep accurate records of the minutes of the meetings, records of pilots' earnings, mileage piloted, accident reports, licenses, applications for licenses, examinations for licenses, and any and all other records deemed necessary by the board.

[Order 2-68, § 296-116-050, filed 11/1/68; § 5, effective 11/25/58.]

WAC 296-116-060 Personnel. The board shall employ the necessary personnel for the conduct of its business following the personnel practices and salary schedules of the Washington state ferries.

[Statutory Authority: RCW 88.16.035 and 88.16.155. 78-09-057 (Order 78-2, Resolution No. 78-2), § 296-116-060, filed 8/23/78; Order 2-68, § 296-116-060, filed 11/1/68; § 6, effective 11/25/58.]

WAC 296-116-070 Collection of fees. All pilots shall pay an annual license fee of one thousand five hundred dollars for every year in which they perform any pilotage services. If a licensed pilot does not perform pilotage services during a license year, his fee for that year shall be reduced to five hundred dollars upon application to the board. The board of pilotage commissioners shall receive all fees for licenses or for other purposes and make proper accounting of same and transmit all such funds to the pilotage account.

[Statutory Authority: RCW 88.16.035. 88-14-063 (Order 88-13, Resolution No. 88-13), § 296-116-070, filed 7/1/88. Statutory Authority: RCW 88.16.090. 85-15-032 (Order 85-1, Resolution No. 85-1), § 296-116-070, filed 7/12/85; 84-11-056 (Order 84-4, Resolution No. 84-4), § 296-116-070, filed 5/18/84. Statutory Authority: RCW 88.16.035. 82-24-010 (Order 82-8, Resolution No. 82-8), § 296-116-070, filed 11/18/82; 79-11-063 (Order 79-5, Resolution No. 79-5), § 296-116-070, filed 10/18/79. Statutory Authority: RCW 88.16.035 and 88.16.155. 78-09-057 (Order 78-2,

Resolution No. 78-2), § 296-116-070, filed 8/23/78; Order 2-68, § 296-116-070, filed 11/1/68; § 7, effective 11/25/58.]

WAC 296-116-075 Qualifications for pilot applicants. Under the authority of RCW 88.16.090 pilot applicants, in addition to meeting the requirements therein, must hold a first class United States endorsement without restrictions on the United States government license to pilot in the pilotage districts for which the pilot applicant desires to be licensed and meet one of the following additional requirements before taking the Washington state pilotage examination:

(1) One year of service in ocean or near coastal waters as a master of cargo, tank, or passenger vessels of 5000 gross tons or more while holding a license as a master of ocean steam or motor vessels of any gross tons or as a master of near coastal steam or motor vessels of any gross tons; or

(2) Two years of service in ocean or near coastal waters as a master of cargo, tank, or passenger vessels of 450 gross tons or more while holding a license as a master of ocean or near coastal steam or motor vessels of not more than 1600 gross tons; or

(3) Two years of service in inland waters as a master of cargo, tank, or passenger vessels of 500 gross tons or more while holding a license as a master of ocean, near coastal or inland steam or motor vessels of not more than 1600 gross tons; or

(4) Two years of service as a master of towing vessels of 100 gross tons or more while holding a license as a master of ocean, near coastal or inland steam or motor vessels of not more than 1600 gross tons; or

(5) Three years of service as a member of an organized professional pilots association or as a U.S. government employed pilot during which period the applicant was actively engaged in piloting. Hold as a minimum a license as a master of ocean, near coastal or inland steam or motor vessels of not more than 1600 gross tons; or

(6) Two years of service as a commanding officer of U.S. government vessels of not less than 1000 gross tons and hold a license as either a master of ocean or near coastal steam or motor vessels of any gross tons.

(7) As used in this section "cargo, tank, or passenger vessels" shall refer to vessels primarily engaged in the transportation of cargo or passengers between points.

[Statutory Authority: RCW 88.16.090(2). 92-15-064, § 296-116-075, filed 7/14/92, effective 8/14/92. Statutory Authority: RCW 88.16.035(2). 90-17-094, § 296-116-075, filed 8/20/90, effective 9/20/90. Statutory Authority: RCW 88.16.090. 82-15-026 (Order 82-6, Resolution No. 82-6), § 296-116-075, filed 7/14/82.]

WAC 296-116-080 Licensing of pilots. (1) No person shall be licensed by the board unless he has applied for a pilotage license and successfully completed: (a) The pilotage examination; (b) familiarization trips required by the board; and (c) the pilotage training program, if applicable.

The majority of the entire board shall pass on the licensing of a pilot and licenses shall be signed by the chairperson. All applicants shall have and display a United States Government Masters License and a first class United States endorsement without restrictions on that license to pilot in whichever pilotage district the applicant desires a

license. In addition all applicants shall have and display an endorsement to their masters license issued by the United States Coast Guard certifying competence as a radar observer.

(2) Prior to commencing familiarization trips, and the pilot training program, if applicable, an applicant must pass a written and oral examination given and graded by the board. Notice of the examination shall be published four months in advance by one paid advertisement in a major newspaper and written notice to one radio station, one television station, United Press International, and the Associated Press, as well as all pilots licensed by the board and all operators registered with the board. Applications will be accepted by the board immediately following the publication of the notice of the examination. The board may, in an emergency, call for an immediate examination on less than four months notice.

(a) The examination may be taken by all qualified applicants who:

(i) Have had a license application on file with the board for at least one month prior to the examination. (This requirement may be waived upon the showing of good cause;)

(ii) Have tendered a nonrefundable examination fee of three hundred dollars. The board may, at its discretion, refund the examination fee for an applicant who is unable to sit for the examination.

(iii) Have had a physical examination by a physician designated by the board not more than thirty days prior to the examination to determine his physical fitness to be a pilot.

(b) The examination shall be in compliance with RCW 88.16.090 and shall consist of questions covering, but not limited to, the following subjects as they pertain to the pilotage district for which the examination is being given:

(i) Rules of the road as set forth in United States government publications;

(ii) Aids to navigation;

(iii) Courses, distances, and distance past abeam at change-of-course points, course points within channels, waterways, and navigable tributaries within the pilotage district for which the examination is being given;

(iv) Cable crossing areas;

(v) Channel and passage widths, depths and shoal areas;

(vi) Bridge signals - width, regulations, and closed periods;

(vii) Ship handling, docking and undocking problems, use of towboats and anchors, and seamanship;

(viii) Vessel traffic system regulations where applicable;

(ix) Ranges for determining compass error and measured miles;

(x) Channel ranges;

(xi) Engine and rudder order commands for United States and foreign merchant vessels and United States naval vessels;

(xii) Operation and use of marine radar, including rapid plotting techniques;

(xiii) Knowledge of tidal currents and ability to calculate currents and tides;

(xiv) Pier, wharf, or terminal locations and berth numbers; dock or pier headings, lengths, and minimum depths of water alongside;

(xv) Prohibited areas, restricted areas, and explosive anchorages;

(xvi) Use of navigational and bridge instruments;

(xvii) Anchorage locations;

(xviii) Duties of pilot;

(xix) Relationship between pilot and master;

(xx) Location and meaning of storm warning signals;

(xxi) Meaning of one and two flag signals;

(xxii) United States government public health quarantine regulations;

(xxiii) Harbor regulations;

(xxiv) Washington State Pilotage Act and rules of the board of pilotage commissioners;

(xxv) Chart knowledge, including chart symbols and abbreviations as set forth in the latest department of commerce NOS (National Ocean Survey) Chart No. 1.

(3) After passing the examination, applicants for the Puget Sound pilotage district must enter and successfully complete a training program. In this program applicants shall be required to pilot vessels under the supervision of Puget Sound pilots with more than five years experience. Upon written request by an applicant to the board, the five years' experience requirement for the supervisory pilot may be waived in certain instances. After every such assignment the supervisory pilots shall fill out, on a form provided by the board, an evaluation of the applicant's performance. After completion of the training period, the board shall evaluate the applicant's performance in shiphandling skills on the basis of these forms and other relevant information and decide whether the applicant should be licensed. Dependent on the applicant's experience level and grade of license, applicants in this training program shall pilot under such supervision for a minimum period of four months and seventy-five assignments and a maximum period of six months and one hundred assignments.

(4) After passing the examination, applicants for the Grays Harbor pilotage district must enter and successfully complete a training program. In this program applicants shall be required to pilot vessels under the supervision of Grays Harbor pilots with more than five years' experience. Upon written request by an applicant, to the board, the five years' experience requirement for the supervisory pilot may be waived in certain instances. After every such assignment the supervisory pilots shall fill out, on a form provided by the board, an evaluation of the applicant's performance. After completion of the training period, the board shall evaluate the applicant's performance in shiphandling skills on the basis of these forms and other relevant information and decide whether the applicant should be licensed. Dependent on the applicant's experience level and grade of license, applicants in this training program shall pilot under such supervision for a minimum period of four months and twenty-five assignments and a maximum period of six months and one hundred assignments.

(5) No person shall be licensed by the board who has been convicted of an offense involving drugs or the personal consumption of alcohol in the twelve months prior to the date of application. This restriction shall not apply to license renewals.

[Statutory Authority: RCW 88.16.035(2). 92-14-070, § 296-116-080, filed 6/26/92, effective 7/27/92. Statutory Authority: RCW 88.16.090(2). 90-23-080, § 296-116-080, filed 11/20/90, effective 12/21/90. Statutory Authority: RCW 88.16.090. 89-18-045 (Order 89-7, Resolution No. 89-7), § 296-116-080, filed 8/31/89, effective 10/1/89; 88-10-037 (Order 88-9, Resolution No. 88-9), § 296-116-080, filed 5/3/88. Statutory Authority: RCW 88.16.035. 86-07-010 (Order 86-2, Resolution No. 86-2), § 296-116-080, filed 3/10/86. Statutory Authority: RCW 88.16.090. 82-15-028 (Order 82-7, Resolution No. 82-7), § 296-116-080, filed 7/14/82; 81-21-019 (Order 81-4, Resolution No. 81-4), § 296-116-080, filed 10/13/81. Statutory Authority: RCW 88.16.035. 80-03-081 (Order 79-6, Resolution No. 79-6), § 296-116-080, filed 3/4/80; 79-11-063 (Order 79-5, Resolution No. 79-5), § 296-116-080, filed 10/18/79; 79-05-023 (Order 79-2, Resolution No. 79-2), § 296-116-080, filed 4/17/79; Order 75-8, § 296-116-080, filed 3/10/75; Order 73-6, § 296-116-080, filed 5/11/73; Order 2-68, § 296-116-080, filed 11/1/68; § 8, effective 11/25/58.]

WAC 296-116-081 Rest period. (1) Pilots shall observe rest period requirements as set out in RCW 88.16.103 as now or hereafter amended. For purposes of applying this rule an assignment shall begin at the pilot's dispatched departure time if the pilot is on board, regardless of when the ship actually sails. The assignment ends when the pilot leaves the vessel. Travel time shall not be included in an assignment.

[Statutory Authority: RCW 88.16.035. 79-05-023 (Order 79-2, Resolution No. 79-2), § 296-116-081, filed 4/17/79; Order 73-6, § 296-116-081, filed 5/11/73.]

WAC 296-116-082 Limitations on new pilots. (1) The following limitations shall apply to a newly licensed pilot during his/her first five years of active service. Except where otherwise noted, the pilotage assignment may include docking and undocking of vessels within the tonnage limitations. All tonnages referred to are international tonnages.

(2) Progressive lifting of tonnage limitations requires a newly licensed pilot to satisfactorily complete the familiarization/training trips listed under the supervision of a five-year pilot. This veteran pilot shall complete and submit an evaluation form for each trip a new pilot performs. All of these trips must, if practical, be completed during the last ninety days of the license year.

(3) Puget Sound pilotage district - License limitations.

(a) First year:

(i) Not authorized to pilot loaded petroleum tankers.

(ii) Not authorized to pilot any vessels in excess of 25,000 gt or 660' in length or any passenger vessels in excess of 5,000 gt.

(b) Second year:

(i) Not authorized to pilot loaded petroleum tankers in excess of 25,000 gt.

(ii) Not authorized to pilot any vessels in excess of 30,000 gt.

(c) Third year:

(i) Not authorized to pilot loaded petroleum tankers in excess of 32,000 gt.

(ii) Not authorized to pilot any vessels in excess of 45,000 gt.

(d) Fourth year:

(i) Not authorized to pilot loaded petroleum tankers in excess of 32,000 gt.

(ii) Not authorized to pilot any vessels in excess of 60,000 gt.

(e) Fifth year:

(i) Not authorized to pilot loaded petroleum tankers in excess of 45,000 gt.

(ii) Not authorized to pilot any vessels in excess of 75,000 gt.

(4) Puget Sound pilotage district - Familiarization/training trips.

(a) Prior to the expiration of the FIRST license year, a new pilot must make three familiarization/training trips, two of which shall involve docking loaded petroleum tankers of not more than 25,000 gt; and the third trip shall involve a bridge and waterway transit of a vessel between 25,000 and 35,000 gt.

(b) Prior to the expiration of the SECOND license year, a new pilot must make three familiarization/training trips, two of which shall involve docking loaded petroleum tankers between 25,000 and 32,000 gt; and the third trip shall involve the anchoring of a vessel between 30,000 and 45,000 gt.

(c) Prior to the expiration of the THIRD license year, a new pilot must make two familiarization/training trips which shall involve the docking of vessels between 45,000 and 55,000 gt other than loaded petroleum tankers.

(d) Prior to the expiration of the FOURTH license year, a new pilot must make three familiarization/training trips which shall involve docking loaded petroleum tankers of between 32,000 and 45,000 gt.

(e) Prior to the expiration of the FIFTH license year, a new pilot must make three familiarization/training trips which shall involve two trips docking and one trip anchoring loaded petroleum tankers of 55,000 gt or larger.

(5) Grays Harbor pilotage district - License limitations.

(a) First year:

(i) Not authorized to pilot loaded tankers or barges carrying chemical or petroleum products.

(ii) Not authorized to pilot any vessels in excess of 17,500 gt.

(iii) Not authorized to pilot loaded or partially loaded vessels through the Chehalis River bridges.

(b) Second year:

(i) Not authorized to pilot loaded tankers or barges carrying chemical or petroleum products in excess of 10,000 gt.

(ii) Not authorized to pilot any vessels in excess of 20,000 gt.

(c) Third year: Not authorized to pilot any vessels in excess of 22,500 gt.

(d) Fourth Year: Not authorized to pilot any vessels in excess of 25,000 gt.

(e) Fifth year: Not authorized to pilot any vessels in excess of 27,500 gt.

(6) Grays Harbor pilotage district - Familiarization/training trips.

(a) Prior to the expiration of the FIRST license year, a new pilot must make ten familiarization/training trips. Eight of these trips shall be through the Chehalis River bridges on loaded or partially loaded vessels. The other trips may be elsewhere on the waterway but shall be on vessels in excess of 17,500 gt.

(b) Prior to the expiration of the SECOND license year, a new pilot must make three familiarization/training trips on vessels in excess of 20,000 gt. Two of these trips shall

involve docking and passage to or from the sea buoy; and one of these trips shall involve turning the vessel in the waterway.

(c) Prior to the expiration of the THIRD license year, a new pilot must make three familiarization/training trips on vessels in excess of 25,000 gt to or from the sea buoy. Two of these trips shall involve docking these vessels.

(d) Prior to the expiration of the FOURTH license year, a new pilot must make three familiarization/training trips on vessels in excess of 27,500 gt or on the nearest larger size vessels available. Two of these trips shall involve docking these vessels; and one of these trips shall involve turning the vessel in the waterway.

(e) Prior to the expiration of the FIFTH license year, a new pilot must make three familiarization/training trips on vessels in excess of 30,000 gt or on the nearest larger size vessels available.

(7) The initial license shall contain the limitations contained above and list the date of commencement and expiration of such periods. If a newly licensed pilot is unable to pilot for forty-five days or more in any one of the five years, he shall notify the board and request a revised schedule of limitations.

(8) No pilot shall be dispatched to, or accept an assignment on, any vessel which exceeds the limitations of his/her license. On vessels in which there is more than one pilot assigned, the license limitations shall apply only to the pilot in charge.

(9) All limitations on a new pilot's license shall be lifted at the beginning of the sixth year of piloting provided he/she has submitted to the board a statement attesting to the fact that he/she has completed all the required familiarization/training requirements and the vessel simulator courses required.

[Statutory Authority: RCW 88.16.035 and 88.16.105. 93-09-016, § 296-116-082, filed 4/14/93, effective 5/15/93. Statutory Authority: RCW 88.16.105. 92-24-056, § 296-116-082, filed 11/30/92, effective 12/31/92; 92-08-051, § 296-116-082, filed 3/26/92, effective 4/26/92; 89-18-063 (Order 89-6, Resolution No. 89-6), § 296-116-082, filed 9/1/89, effective 10/2/89; 89-11-060 (Order 89-5, Resolution No. 89-5), § 296-116-082, filed 5/18/89. Statutory Authority: RCW 88.16.035. 80-03-081 (Order 79-6, Resolution No. 79-6), § 296-116-082, filed 3/4/80.]

WAC 296-116-083 Examination review and appeal procedures. (1) Any candidate who takes the state examination for licensure may request a review by the board of his or her examination results. This request must be in writing and must be received by the board within fifteen days of receipt of notification of the examination results. The board will not set aside its prior determination unless the candidate proves the challenged score was the result of fraud, coercion, arbitrariness or manifest unfairness by the board. The board will not consider any challenges to examination scores unless the total revised score could result in a higher ranking to enter the training program or a passing grade on the pilotage examination.

(2) The procedure for filing a review is as follows:

(a) Contact the board office for an appointment to appear personally to review incorrect answers on the examination.

(b) The candidate will be provided a form to complete in the board office in defense of the examinee's examination answers.

(c) The candidate must state the specific reason or reasons why the candidate feels the results of the examination should be changed.

(d) The candidate will be identified only by candidate number for the purpose of this review. Letters of reference or requests for special consideration will not be read or considered by the board.

(e) Candidates may not bring in notes or texts for use while completing the informal review form.

(f) Candidates will not be allowed to take any notes or materials from the office upon leaving.

(g) The board will schedule a closed session meeting to review the examinations and forms completed by the candidate for the purpose of informal review.

(h) The candidates will be notified in writing of the results.

(3) Any candidate who is not satisfied with the result of the examination review may request a formal hearing pursuant to RCW 88.16.100. Such hearing must be requested within thirty days of receipt of the result of the board's review of the examination results.

[Statutory Authority: RCW 88.16.035, 88-10-038 (Order 88-10, Resolution No. 88-10), § 296-116-083, filed 5/3/88.]

WAC 296-116-085 Association bylaws. The association of pilots for the Puget Sound pilotage district, together with the association of pilots for the Grays Harbor pilotage district, shall maintain on file with the commission a current copy of their respective association bylaws and amendments. Hereafter they shall file with the commission each new amendment adopted by their respective groups in order that the board may be kept informed of association acts and activities.

[Statutory Authority: RCW 88.16.035, 82-13-087 (Order 82-10-049, Resolution No. 82-10-049), § 296-116-085, filed 6/23/82; Order 76-12, § 296-116-085, filed 4/22/76.]

WAC 296-116-110 Details and requirements of annual license fee payment, physical examination report and reinstatement application. (1) Annual license fees and reports on annual physical examinations pursuant to RCW 88.16.090 shall be submitted to the board on or before the anniversary date of the license. Each pilot shall ensure that the board, at all time, possesses a copy of his/her currently valid United States government license with radar endorsement issued by the United States Coast Guard.

(2) A pilot, who retires under his/her medical disability retirement plan, may apply for reinstatement of his/her pilot's license within five years from the date of their last pilotage assignment, provided they are capable of passing a physical examination without any restrictions as to full pilotage duties. The board may, at its discretion, waive all or part of the pilotage examination. The board shall require the pilot to complete a familiarization/training program prescribed by the board after a full review of all relevant factors. The board may also prescribe license limitations such as those contained in WAC 296-116-082.

[Statutory Authority: RCW 88.16.090, 93-07-076, § 296-116-110, filed 3/18/93, effective 4/18/93. Statutory Authority: RCW 88.16.035, 92-08-050, § 296-116-110, filed 3/26/92, effective 4/26/92; 80-03-081 (Order 79-6, Resolution No. 79-6), § 296-116-110, filed 3/4/80; Order 2-68, § 296-116-110, filed 11/1/68; § 11, effective 11/25/58.]

WAC 296-116-115 Sanctions for drug and alcohol offenders. (1) The board shall review the pilot's license of any pilot who, within the preceding twelve months, has been convicted of any offense involving drugs or the personal consumption of alcohol while on duty, including an offense of operating a vessel or vehicle while under the influence of alcohol or drugs.

(2) Where a pilot is found to have been convicted of an offense involving drugs or the personal consumption of alcohol while on duty within the prior twelve months, but who has not been convicted of an offense involving drugs or the personal consumption of alcohol in the previous five years, and after a hearing held pursuant to RCW 88.16.100(5), the board shall: Order the pilot to actively participate in and satisfactorily complete a specific program of treatment. The board may impose such other sanctions as it deems appropriate. If the pilot does not satisfactorily complete the program of treatment, the board shall suspend, revoke, or withhold the pilot's license until the treatment is completed.

(3) Where a pilot is found to have been convicted of a second or subsequent offense involving drugs or the personal consumption of alcohol while on duty within the prior twelve months, the board, after a hearing is held pursuant to RCW 88.16.100(5), shall suspend the license of the pilot for up to one year.

(4) The board shall immediately notify the United States Coast Guard that it has revoked or suspended a license pursuant to this section and the board shall also notify the United States Coast Guard when a suspended or revoked license has been reinstated.

[Statutory Authority: RCW 88.16.100(4), 90-23-081, § 296-116-115, filed 11/20/90, effective 12/21/90.]

WAC 296-116-120 Job description—Physical examination—Health requirements. (1) A Washington state licensed marine pilot, under the authority of the master, directs ships into and out of harbors, estuaries, straits, sounds, rivers, lakes, and bays using a specialized knowledge of local conditions including winds, weather, tides, and current; Orders officers and helmsman by giving course and speed changes and navigates ship to avoid conflicting marine traffic, congested fishing fleets, reefs, outlying shoals and other hazards to shipping; utilizes aids to navigation, such as lighthouses and buoys. Utilizes ship's bridge equipment, including radar, fathometer, speed log, gyro, magnetic compass, whistle or horn and other navigational equipment as needed. Required to use ship's radio equipment in contacting U.S. Coast Guard vessel traffic system and other ships while ship is in transit. Directs ship's officers, crewmen, and tug boat captains as necessary, when ships are transiting bridges, narrow waterways, anchoring, docking, and undocking. Must perform duties day or night in all weather conditions, including high winds, fog, mist, rainfall, falling snow and other adverse conditions, as encountered.

In order to safely perform the foregoing duties, a Washington state licensed marine pilot shall:

(a) Be physically qualified to possess a U.S. Coast Guard master's license, as required by the state of Washington.

(b) Be capable of boarding a vessel from and leaving a vessel into a pilot boat via a Jacob's ladder and a gangway. A Jacob's ladder involves a vertical climb or descent of up to nine meters and requires both physical energy and mental judgment.

(c) Be capable of moving to a more desirable vantage point in a timely manner, so as to avoid a close quarters situation when the physical characteristics of the ship or cargo obstruct the pilot's field of vision.

(d) Be able to meet the necessary eyesight and hearing requirements to carry out marine pilotage duties.

(e) Have mental reflexes capable of allowing decisions to be made without delay. This is imperative in all aspects of ship handling.

(f) Be capable of withstanding mental stresses which may occur with a vessel in lowered visibility, in a close quarters situation or when docking or undocking.

(g) Be capable of working efficiently and effectively at any time of the day or night, including irregular and unscheduled hours, after sufficient rest.

(h) Possess mental maturity and show mental responsibility.

(2) In order to determine the physical fitness of persons to serve as licensed pilots under the provisions of the pilotage act, all licensed pilots and applicants shall be required to pass a general physical examination annually within forty-five days prior to the date their annual state pilot license fee is due. The physical examination required of all pilots and initial applicants shall demonstrate that he/she is fully able to carry out the duties of a pilot. The examination shall assure that one's abilities as a pilot will not be impaired by eyesight, hearing or other bodily function. As part of this examination pilots and applicants shall have completed on a form provided by the board a detailed report of physical examination. Each pilot is required to report on the form any convictions of offenses involving drugs or the personal consumption of alcohol which occurred while on duty within the prior twelve months. Applicants for a license must report on the form any and all convictions of offenses involving drugs or the personal consumption of alcohol which occurred within the twelve months prior to the date of their application. This form shall be prepared by the examining physician and shall be submitted to the board along with a letter stating his/her findings/recommendations as to the ability of the pilot or applicant to safely perform the pilotage duties based on the job description for a Washington state licensed marine pilot and the standards set forth below. The examining physician should review these standards and review the job description in subsection (1) of this section before making findings/recommendations as to the medical fitness of the applicant. A medical/occupational history form will be completed and signed by the initial applicant for review of the physician prior to the initial examination. The board may in its discretion check with the appropriate authorities for any convictions of offenses involving drugs or the personal consumption of alcohol in the prior twelve months. The detailed report of physical

examination is a confidential record and will not be available for public inspection. Such examination shall be obtained at the expense of the licensed pilot or applicant from a physician or physicians designated in advance by the board. The secretary of the board shall give each pilot or applicant reasonable written notice of the date when any such physical examination becomes due and shall specify the name of the physicians then approved by the board to conduct such physical examination.

(3) Based upon the findings/recommendations of the examining physician and review by the board, the board will make the determination as to the applicant or pilot's fitness to perform the duties of a pilot. This determination will be made within ninety days after each annual physical examination.

(4) The purpose of the history and physical examination is to detect the presence of physical, mental, or organic defects of such character and extent as to affect an individual's ability to pilot a vessel safely. The examination will be made carefully and at least as complete as indicated by the form provided by the board. History of certain defects may be cause for rejection of the initial applicant or indicate the need for making certain laboratory tests or a further and more stringent examination. Defects may be recorded which do not, because of their character or degree, indicate that certification of physical fitness should be denied. However, these defects should be discussed with the applicant or pilot who should be advised to take the necessary steps to ensure correction, particularly of those which, if neglected, might lead to a condition likely to affect the ability to perform the duties of a pilot.

(5) The board has determined which physical conditions may be permanently disqualifying for initial applicants as well as which conditions may be permanently disqualifying for renewal of license. Certain conditions are not necessarily disqualifying, for renewal of licensure only, when, based on the knowledge and experience of the examining physician these conditions can be managed medically and without threat to the pilot's ability to perform the duties of a pilot. An individual may be disqualified when, in the opinion of the examining physician, there is reasonable probability that a condition can occur suddenly and without warning which would render the applicant incapable of promptly responding, both mentally and physically to emergency situations. When certain conditions exist the medical examiner may recommend either:

(a) A permanent disqualification; or

(b) A temporary disqualification until which time the condition is either corrected or medically managed.

(6) Initial applicants will be required to take a test indicating they are free of illegal substance abuse. Testing will be for the presence of cocaine, opiates, marijuana (THC), amphetamines and PCP (phencyclidine). Testing will be in accordance with the Department of Transportation (Coast Guard) guidelines outlined in the Federal Register 46 CFR 4, 5, and 16. Urine specimens are to be analyzed by a laboratory that meets DHHS regulations set forth by the National Institute of Drug Abuse (NIDA).

Chain of custody forms and instructions for collection and transport to a NIDA approved laboratory can be obtained from:

Laboratory of Pathology
 Nordstrom Medical Tower
 P.O. Box 14950
 Seattle, WA 98114-0950
 (206) 386-2872

(7) The conditions in these standards are listed according to the International Classification of Diseases (ICD). Some categories may not apply to the standards set forth and therefore may be absent in some listings. However, all categories should be taken into consideration by the examining physician.

- (a) Infectious and parasitic diseases.
- (b) Neoplasms.
- (c) Endocrine, nutritional, metabolic, and immunity disorders.
- (d) Diseases of the blood and blood forming organs.
- (e) Mental disorders.
- (f) Diseases of the nervous system and sense organs.
- (g) Diseases of the respiratory system.
- (h) Diseases of the digestive system.
- (i) Diseases of the genitourinary system.
- (j) Complications of pregnancy, childbirth, and the puerperium.
- (k) Diseases of the skin and subcutaneous tissues.
- (l) Diseases of the musculoskeletal system and connective tissues.
- (m) Congenital anomalies.
- (n) Certain conditions originating in the perinatal period.
- (o) Symptoms, signs, and other ill defined conditions.
- (p) Injury and poisonings.

(8) The guidelines for recommended visual standards are based on the necessity of a pilot to be able to safely perform the duties of a pilot, including functioning under all emergency conditions aboard the vessel. Consideration must be given to the pilot's previously demonstrated ability to perform his or her pilotage duties.

(a) The visual acuity of an applicant shall be at least 20/200 in each eye uncorrected and correctable to at least 20/40 in each eye as determined by Snellen test or its equivalent unless applicant qualifies for a waiver from the Officer in Charge, Marine Inspection, or the Commandant, U.S. Coast Guard.

(b) The initial applicant should have normal color vision per pseudo isochromatic plates, Ishihara or Keystone test. If the initial applicant fails this test, the Farnsworth or Williams Lantern tests or their equivalent may be used to determine the initial applicant's ability to distinguish primary colors.

(c) Loss of vision in one eye may not be disqualifying if one eye passes the test required for the better eye of the applicant with binocular vision and the applicant has had sufficient time to develop and demonstrate adequate judgment of distances.

(d) Applicants who wear corrective lenses and meet the qualifications in (a) of this subsection are medically fit to carry out pilotage duties only while wearing their corrective lenses and if they have with them, while on duty, a spare pair of correcting lenses that provide at least the same visual acuity.

(9) Baseline audiograms shall be performed on all entry level applicants. All licensed pilots will be tested annually, with the first audiogram considered baseline. Each ear will

be tested separately using properly calibrated equipment which meets ANSI (American National Standards Institute) standards criteria for background noise in audiometric rooms. Testing should not be performed unless the applicant has been free of work noise or intense noise for a period of at least fourteen hours prior to testing. Should the applicant have a current condition which can cause a temporary hearing loss, such as cold, the applicant should be rescheduled for testing in two weeks, or until such condition is resolved. Testing will be performed by a licensed audiologist, otolaryngologist, physician with sufficient training in conducting and interpreting audiograms, or a technician who is currently certified by the Council for Accreditation in Occupational Hearing Conservation (CAOHC).

(a) A baseline audiogram is required on all initial applicants. The first audiogram performed on a currently licensed pilot shall be considered the baseline audiogram.

(b) Applicants having hearing threshold levels that do not exceed 40 dB at frequencies of 500, 1000, 2000, 3000 Hz in either ear are considered to have normal hearing for communication purposes.

(c) Annual audiograms will be performed thereafter for the purposes of comparison to baseline. A significant threshold shift is defined as a change averaging more than 10 dB from baseline in the frequencies of 500, 1000, 2000, and 3000 Hz and requires further evaluation by a physician, otolaryngologist, or audiologist and preventive action taken on the part of the pilot.

(d) Mechanical acoustical devices (hearing aids) are not disqualifying but should not be worn in areas of high background noise levels in order to prevent further deterioration of his/her hearing.

(e) An applicant must minimally be able to hear an average conversational voice in a quiet room while standing with his/her back turned at a distance of eight feet.

(10) Below is a list of conditions which can be absolutely disqualifying for initial licensure as a maritime pilot. The list of causes for disqualification is not all inclusive or intended to be complete, but represents the types of conditions that would interfere with the safe performance of pilotage duties. This guide is not intended to replace the physician's professional judgment. Rather, it calls for the physician and the board to closely examine whether the applicant can safely perform the tasks outlined in the job description of a Washington state licensed marine pilot. The examining physician should also be aware that a second opinion concerning the diagnosis may be sought in cases of unfavorable determinations. A condition should only be considered disqualifying while such condition persists. Following corrective medical action the applicant should be encouraged to apply for reentry.

Conditions Which Can Be Absolutely Disqualifying For Initial Licensure

1. Infectious and parasitic diseases - Any communicable disease in its communicable or carrier stage.
2. Neoplasms - Malignant diseases of all kinds in any location.
3. Endocrine, nutritional, metabolic, and immunity disorders - Diabetes requiring insulin or hypoglycemic drugs; cirrhosis of the liver; alcohol abuse (unless abstinence for two years).

4. Diseases of the blood and blood forming organs - Hemophilia; acute or chronic significant anemias.

5. Mental disorders - Severe personality disorders; use of illegal drugs; dementia of Alzheimer's type, senility, psychosis.

6. Diseases of the nervous system and sense organs - Epilepsy or any convulsive disorder resulting in an altered state of consciousness, regardless of control; disturbance of balance; multiple sclerosis; Meniere's syndrome.

7. Diseases of the circulatory system - Multiple myocardial infarctions or cardiac class II or IV (NYHA); hypotension with syncopal episodes; varicose veins if associated with edema, skin ulceration or residual scars. Recurrent thromboembolic conditions.

8. Diseases of the respiratory system - Active pulmonary tuberculosis Class IV respiratory impairment; permanent tracheostomy.

9. Diseases of the genitourinary system - Chronic renal failure; permanent ureterostomy.

10. Complications of pregnancy, childbirth, and the puerperium - Pregnancy is not in itself disqualifying, if, in the opinion of the examining physician and the applicant's obstetrician determine that the pilotage duties can be safely carried out without risk to the mother or fetus and without risk to the safety of the vessel, crew, and property.

11. Diseases of the skin and subcutaneous tissues - There are no absolute exclusions listed for diseases of the skin unless, in the opinion of the examining physician, a condition exists that would interfere with the performance of pilotage duties.

12. Diseases of the musculoskeletal system and connective tissues - Lupus erythematosus, disseminated; amputation of any portion of a limb, resection of a joint, artificial joint or absence of the toes which would preclude the ability to run, walk, balance oneself, grasp and climb ladder rungs; chronic low back pain that is disabling to the degree of interfering with job requirements.

13. Congenital anomalies - Any existing condition that, in the opinion of the examining physician, would interfere with the safe performance of pilotage duties.

14. Symptoms, signs, and other ill defined conditions - Serious degree of stuttering or speech impediment sufficient to interfere with communication; alcoholism; drug addiction, other than tobacco or caffeine.

15. Injury or poisonings - May be temporarily disqualifying until condition resolved without disabling sequelae.

(11) Below is a list of conditions which can be absolutely disqualifying for relicensure as a maritime pilot. The list of causes for disqualification is not all inclusive or intended to be complete, but represent the types of conditions that would interfere with the safe performance of pilotage duties. This guide is not intended to replace the physician's professional judgment. Rather, it calls for the physician and the board to closely examine whether the applicant can continue to safely perform the tasks outlined in the job description of a Washington state licensed marine pilot. The examining physician should also be aware that a second opinion concerning diagnosis may be sought in cases of unfavorable determinations.

Conditions Which Can Be Absolutely Disqualifying For Relicensure

1. Neoplasms - Malignancies with metastases.

2. Endocrine, nutritional, metabolic, and immunity disorders - Cirrhosis of the liver with hepatic failure.

3. Diseases of the blood and blood forming organs - Hemophilia; acute leukemia.

4. Mental disorders - Severe personality disorders; senility; dementia of Alzheimer's type psychosis.

5. Diseases of the nervous system and sense organs - Disturbance of balance, permanent and untreatable Meniere's syndrome.

6. Diseases of the circulatory system - Multiple myocardial infarctions or cardiac Class III or IV (NYHA); hypotension with syncopal episodes; varicose veins if associated with edema, skin ulceration or residual scars. Recurrent thromboembolic conditions.

7. Diseases of the respiratory system - Active pulmonary tuberculosis; Class IV respiratory impairment.

8. Diseases of the genitourinary system - Chronic renal failure; permanent ureterostomy.

9. Complications of pregnancy, childbirth, and puerperium - Pregnancy is not in itself disqualifying, if, in the opinion of the examining physician and the applicant's obstetrician determine that the pilotage duties can be safely carried out without risk to the mother or fetus and without risk to the safety of the vessel, crew and property.

10. Diseases of the skin and subcutaneous tissues - There are no absolute exclusions for diseases of the skin unless, in the opinion of the examining physician, a condition exists that would interfere with the performance of pilotage duties.

11. Diseases of the musculoskeletal and connective system - Lupus erythematosus, disseminated; amputation of any portion of a limb, resection of a joint, artificial joint or absence of the toes which would preclude the ability to run, walk, balance oneself, grasp, and climb ladder rungs. Chronic low back pain that is disabling to the degree of interfering with job requirements.

12. Symptoms, signs, and other ill defined conditions - Serious degree of stuttering or speech impediment sufficient to interfere with communication; alcoholism; drug addiction, other than tobacco or caffeine. Current need to use methadone, antabuse, antidepressants, antianxiety drugs.

13. Injury or poisonings - May be temporarily disqualifying until condition resolved without disabling sequelae.

(12) Some conditions may develop during the course of employment that would be absolutely disqualifying for initial licensure. In evaluating the impact of such a condition on an existing pilot, the examining physician and the board should take into consideration the pilot's past experience, effectiveness of performance and predictability of his/her performance. The board may waive certain duties of a pilot as outlined in the job description contained in subsection (1) of this section. The list of conditions requiring in-depth evaluation is not all inclusive or intended to be complete, but represent the types of conditions that might interfere with the safe performance of pilotage duties. The examining physician should also be aware that a second opinion concerning the diagnosis may be sought in cases of unfavorable determinations.

Conditions Requiring In-depth Evaluation

1. Neoplasms - Malignancies of any kind.
2. Endocrine, nutritional, metabolic, and immunity disorders - Diabetes requiring hypoglycemic drugs; cirrhosis of the liver.
3. Diseases of the blood and blood forming organs - Chronic leukemia.
4. Mental disorders - Anxiety reactions; depression.
5. Diseases of the nervous system and sense organs - Disturbance of balance; multiple sclerosis; epilepsy or any convulsive disorder resulting in an altered state of consciousness.
6. Diseases of the circulatory system - Uncontrolled hypertension; varicose veins; pacemaker, demand.
7. Diseases of the respiratory system - Respiratory impairment; permanent tracheostomy.
8. Diseases of the digestive system - Permanent colostomy; permanent ileostomy.
9. Complications of pregnancy, childbirth, and the puerperium - Pregnancy.
10. Diseases of the skin and subcutaneous tissues - Any skin disorders that, in the opinion of the examining physician, may interfere with the performance of pilotage duties.
11. Diseases of the musculoskeletal system and connective tissues - Lupus erythematosus, disseminated; artificial joints; chronic low back pain.
12. Injury or poisonings - May be temporarily disqualifying until condition resolved without disabling sequelae.
13. A pilot may be temporarily relieved of pilotage duties until such time as a disqualifying condition is resolved or medically managed and with frequent evaluation by the examining physician or specialist. In this case, the board, after consulting with the physician, will determine the frequency of medical examinations. A condition should only be considered disqualifying while such a condition persists. Following corrective medical action, the individual may be removed from temporary disqualification. Provided that, if a temporary disqualifying condition continues for longer than two years from the time the pilot is initially relieved of pilotage duties, the board, in its discretion and after a full review of all relevant factors, may make a determination that the condition is permanently disqualifying.

[Statutory Authority: RCW 88.16.090(6) and 88.16.100(4). 90-24-019, § 296-116-120, filed 11/28/90, effective 12/29/90. Statutory Authority: RCW 88.16.090(6). 90-13-065, § 296-116-120, filed 6/18/90, effective 7/19/90. Statutory Authority: RCW 88.16.090. 88-09-027 (Order 88-5, Resolution No. 88-5), § 296-116-120, filed 4/14/88; 85-15-033 (Order 85-2, Resolution No. 85-2), § 296-116-120, filed 7/12/85. Statutory Authority: RCW 88.16.035 and 88.16.090(6). 80-16-005 (Resolution No. 79-5), § 296-116-120, filed 10/23/80. Statutory Authority: RCW 88.16.035. 79-11-063 (Order 79-5, Resolution No. 79-5), § 296-116-120, filed 10/18/79; Order 73-6, § 296-116-120, filed 5/11/73; Order 2-68, § 296-116-120, filed 11/1/68; § 12, effective 11/25/58.]

WAC 296-116-140 Limitations.

[Order 2-68, § 296-116-140, filed 11/1/68.]

WAC 296-116-150 Registration of operators. All ship owners, operators and agents of owners and operators whose vessels are subject to the pilotage act must register with the board and keep the board advised of any change of name or address.

[Order 2-68, § 296-116-150, filed 11/1/68; § 15, effective 11/25/58.]

WAC 296-116-170 Pilotage station. Port Angeles is hereby declared the location of the pilotage station for Puget Sound and adjacent inland waters and tariffs shall be assessed accordingly. Boundary pilotage shall apply on ships going to and coming from all British Columbia ports.

[Order 2-68, § 296-116-170, filed 11/1/68; § 17, effective 11/25/58.]

WAC 296-116-175 Tariff proposals. The board of pilotage commissioners has been charged with certain statutory duties by RCW 88.16.035. To assist the board in its responsibilities to provide for the maintenance of efficient and competent pilotage services and to annually fix the pilotage tariffs for pilotage services to be performed on the waters covered by chapter 88.16 RCW, it shall be the policy that licensed pilots, ship operators, and interested members of the public may jointly or separately present tariff proposals to the board for its consideration. To that end, individual Washington state licensed pilots, independent ship owners or operators, members of the public and/or agents, committees or organizations representing said persons or corporations are authorized to meet, discuss, and prepare joint or separate tariff proposals for board consideration. They may appear before the board to support or oppose any such proposal, or part thereof, but the final determination, adoption and active supervision of the rates, charges, expense items, and classifications to be contained in said pilotage tariffs and the rules, regulations, or procedures to implement said annual tariffs shall be made by the board.

[Statutory Authority: RCW 88.16.035. 87-19-100 (Order 87-1, Resolution No. 87-1), § 296-116-175, filed 9/17/87.]

WAC 296-116-185 Tariffs, and pilotage rates for the Grays Harbor pilotage district.

CLASSIFICATION OF PILOTAGE SERVICE RATE

Piloting of vessels in the inland waters and tributaries of Grays Harbor:

Each vessel shall be charged according to its draft and tonnage. The draft charges shall be \$55.95 per meter (or \$17.02 per foot) and the tonnage charge shall be \$0.1784 per net registered ton. The minimum net registered tonnage charge is \$624.27. The charge for an extra vessel (in case of tow) is \$356.74.

Boarding fee:

Per each boarding/deboarding from a boat \$269.15

Harbor shifts:

For each shift from dock to dock, dock to anchorage, anchorage to dock, or anchorage to anchorage \$447.50
 Delays per hour \$106.71
 Cancellation charge (pilot only) \$178.36
 Cancellation charge (pilot boat only) . . . \$535.09

Travel allowance:

Boarding or debarking a vessel off Grays Harbor entrance	\$82.82
Pilot when traveling to an outlying port to join a vessel or returning through an outlying port from a vessel which has been piloted to sea shall be paid \$624.28 for each day or fraction thereof, and the travel expense incurred	\$624.28

Bridge transit:

Charge for each bridge transited	\$195.90
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Miscellaneous:

The balance of amounts due for pilotage rates not paid within 30 days of invoice will be assessed at 1 1/2% per month late charge.

Adopted	6-20-96
Filed	6-28-96
Effective	0001 Hours 8-1-96 through 2400 Hours 7-31-97

[Statutory Authority: RCW 88.16.035, 96-14-062, § 296-116-185, filed 6/28/96, effective 8/1/96; 95-13-054, § 296-116-185, filed 6/16/95, effective 8/1/95; 94-05-006, § 296-116-185, filed 2/3/94, effective 3/6/94; 93-13-055, § 296-116-185, filed 6/16/93, effective 7/17/93; 93-03-080, § 296-116-185, filed 1/19/93, effective 2/19/93; 92-14-069, § 296-116-185, filed 6/26/92, effective 7/27/92; 91-08-008, § 296-116-185, filed 3/26/91, effective 4/26/91; 90-09-013, § 296-116-185, filed 4/6/90, effective 5/7/90; 89-08-042 (Order 89-3, Resolution No. 89-3), § 296-116-185, filed 3/31/89; 88-05-043 (Order 88-2, Resolution No. 88-2), § 296-116-185, filed 2/17/88, effective 3/21/88. Statutory Authority: RCW 88.16.035(4), 87-01-081 (Orders 86-9 and 86-10, Resolution Nos. 86-9 and 86-10), § 296-116-185, filed 12/19/86; 85-02-048 (Order 84-5, Resolution No. 84-5), § 296-116-185, filed 12/31/84; 83-15-012 (Order 83-3, Resolution No. 83-3), § 296-116-185, filed 7/12/83; 82-08-016 (Order 82-1, Resolution No. 82-1), § 296-116-185, filed 3/29/82; 81-07-009 (Order 81-1, Resolution No. 81-1), § 296-116-185, filed 3/6/81; 80-03-081 (Order 79-6, Resolution No. 79-6), § 296-116-185, filed 3/4/80; Order 2-68, § 296-116-185, filed 11/1/68.]

WAC 296-116-200 Duties of pilots. (1) In any case where a vessel in charge of a state licensed pilot shall go aground, collide with another vessel, or dock, or shall meet with any casualty, or be injured or damaged in any way, the said pilot shall, within ten days thereafter, make written report thereof to said board, and the board of pilotage commissioners may thereupon, either with or without complaint being made against the said pilot, investigate the matter reported upon. In any case of apparent damage being sustained or caused by a vessel under his charge, the pilot shall file his written report as soon as possible after returning to shore. It is important that the board be promptly advised of the facts in all cases of accident, without delay.

(2) Pilots will report to the pilot office and to the aids to navigation officer of the U.S. Coast Guard, all changes in lights, range lights, buoys, and any dangers to navigation that may come to their knowledge.

(3) Any pilot who shall fail, neglect or refuse to make a report to the board of pilotage commissioners as required by the pilotage laws of the state, or by these rules and regulations, for a period of ten days after the date when the said report is required to be made, shall be subject to having his license suspended at the discretion of the board, and if he

fails to report for a period of thirty days the board may, at its discretion, revoke his license.

(4) Pilots when so notified in writing shall report in person to the board, at any meeting specified in such notice.

(5) Any pilot summoned to testify before the pilotage board shall appear in accordance with such summons and shall make answer, under oath, to any question put to him which deals with any matter connected with the pilot service, or of the pilotage waters over which he is licensed to act. He shall be entitled to have his attorney or advisor present during any such appearance and testimony.

(6) Any pilot who shall absent himself from his pilotage duties or district for a period of sixty days without permission of the board of pilotage commissioners shall be liable to suspension or to the forfeiture of his license.

(7) A pilot on boarding a ship, if required by the master thereof, shall exhibit his license, or photostatic copy thereof.

(8) When a pilot licensed under this act is employed on an enrolled ship, the same rules and regulations shall apply as pertain to registered ships.

(9) Any state licensed pilot assigned to pilot a vessel entering, leaving, or shifting berths under its own power in any of the waters subject to the provisions of chapter 88.16 RCW shall before assuming pilotage obligations for such vessel obtain assurance from the master that the vessel meets all requirements for safe navigation and maneuvering. In addition, the pilot shall obtain assurance that the ship's officers will maintain navigation procedures by all navigational aids available to insure that the vessel's position is known at all times. If the pilot in his professional judgment considers the vessel to be incapable of safe navigation and maneuvering due to performance limitations, he shall refuse to assume the obligations of pilotage for such vessel until such limitations have been corrected and shall promptly notify the pilot's control station and the chairman of the board of pilotage commissioners of such action.

[Order 73-6, § 296-116-200, filed 5/11/73; Order 2-68, § 296-116-200, filed 11/1/68; § 20, effective 11/25/58.]

WAC 296-116-205 Vessel certification. (1) Upon boarding a vessel in the Puget Sound pilotage district or Grays Harbor pilotage district, a pilot shall request on the form provided in WAC 296-116-2051 that the master of the vessel certify that: (a) The engine room is properly staffed, able to maneuver, and all related equipment is in good order; (b) there are no defects listed against the ship by the United States Coast Guard which would prevent it from sailing; (c) the vessel is not leaking oil; (d) the vessel is experiencing no propulsion or maneuvering difficulties.

If the master is unable to certify that all of the above conditions are met, he shall be asked to certify that the United States Coast Guard captain of the port has been notified of said deficiencies and has authorized the vessel to proceed.

If the master is unable or unwilling to certify that either of the above are the case, the pilot shall not offer pilotage services to said vessel. Instead, the pilot shall disembark from the vessel as soon as practicable, immediately inform the captain of the port of the conditions and circumstances by the best possible means and forward a written report to the board of pilotage commissioners no later than 24 hours

after disembarking from the vessel. Any Washington licensed pilot who offers pilotage services to a vessel on which the master has failed to make a certification required by this section shall be subject to the penalties provided in RCW 88.16.100 and 88.16.150.

(2) Upon boarding vessels in either the Puget Sound pilotage district or the Grays Harbor pilotage district, the pilot shall also request to see the vessel's SOLAS certificate, and the Federal Maritime Commission certificate of financial responsibility.

The pilot shall also inspect the following of the ship's equipment and conditions and indicate their suitability:

VHF radio, channels 13, 14; radar; gyrocompass; rudder angle indicator; whistle; wheelhouse staffed by an officer and helmsman, one of whom speaks English; local, up-to-date charts; and wheelhouse to engine room communications.

(3) The form appearing in WAC 296-116-2051 shall be used by pilots and masters in complying with the above requirements.

(4) Forms completed by masters and pilots which indicate that the vessel is in compliance and nondeficient shall be forwarded to the offices of the board of pilotage commissioners where they will be retained for a period of at least six months. Forms indicating a vessel not in compliance or deficient and forms upon which either the master or the pilot have failed to make the required certification shall be forwarded to the board of pilotage commissioners and retained for a period of at least twelve months.

[Statutory Authority: RCW 88.16.035, 82-13-087 (Order 82-10-049, Resolution No. 82-10-049), § 296-116-205, filed 6/23/82; 79-11-063 (Order 79-5, Resolution No. 79-5), § 296-116-205, filed 10/18/79. Statutory Authority: RCW 88.16.035 and 88.16.155, 78-09-057 (Order 78-2, Resolution No. 78-2), § 296-116-205, filed 8/23/78.]

WAC 296-116-2051 Vessel certification form.

Washington State Board of Pilotage Commissioners

Date:

Vessel Name:

Flag:

MASTER'S CERTIFICATION

I,, Master of this vessel, certify the following information:

Table with 2 columns: Question, Yes, No. Contains 5 certification questions regarding engine room, regulations, safety, leaking oil, and propulsion difficulties.

I have notified the United States Coast Guard Captain of the Port of any deficiencies noted above and he has authorized the vessel to proceed. Any such deficiencies will be corrected before the time the vessel is scheduled to leave the waters of Washington state.

Master's Signature

PILOT'S REPORT

I,, a pilot licensed by the state of Washington, certify that upon boarding the above-named vessel on this date I requested to see the following certificates:

Table with 4 columns: CERTIFICATE, ACCEPTABLE, NOT READILY AVAILABLE, UNACCEPTABLE. Rows include SOLAS Certificate and FMC Certificate of Financial Responsibility.

Pilot's Signature

DEAD SHIP MOVEMENT

I,, owner, master, or agent's representative of this vessel, certify the following information:

Table with 3 columns: Question, Yes, No. Contains 4 questions regarding vessel leaking oil, lights, hull fittings, and seaworthiness.

Owner, Master, or Agent's Representative

[Statutory Authority: RCW 88.16.155(7), 92-08-052, § 296-116-2051, filed 3/26/92, effective 4/26/92. Statutory Authority: RCW 88.16.035 and 88.16.155, 83-16-032 (Order 83-4, Resolution No. 83-4), § 296-116-2051, filed 7/28/83. Statutory Authority: RCW 88.16.155, 79-11-097 (Order 79-6, Resolution No. 79-6), § 296-116-2051, filed 10/29/79. Statutory Authority: RCW 88.16.035 and 88.16.155, 78-09-057 (Order 78-2, Resolution No. 78-2), § 296-116-2051, filed 8/23/78.]

WAC 296-116-300 Pilotage rates for the Puget Sound pilotage district. Effective 0001 hours July 1, 1996, through 2400 hours June 30, 1997.

Table with 2 columns: CLASSIFICATION, RATE. Details boarding fees and harbor shift rates for Seattle Port and other ports.

Harbor shift - Dead ship Double LOA
Zone I
Dead ship towing charge: Double LOA
Zone
LOA of tug + LOA of tow + beam of tow
Any tow exceeding seven hours, two pilots are mandatory. Harbor shifts shall constitute and be limited to those services in moving vessels from dock to dock, from anchorage to dock, from dock to anchorage, or from anchorage to anchorage in the same port after all other applicable tariff charges for pilotage services have been recognized as payable.

Waterway and bridge charges:
Ships up to 90' beam:
A charge of \$187.00 shall be in addition to bridge fees for any vessel movements both inbound and outbound required to transit south of Spokane Street Bridge in Seattle, south of Eleventh Street Bridge in any of the Tacoma waterways, in Port Gamble, or in the Snohomish River. Any vessel movements required to transit through bridges shall have an additional charge of \$89.00 per bridge.

Ships 90' beam and/or over:
A charge of \$251.00 shall be in addition to bridge fees for any vessel movements both inbound and outbound required to transit south of Spokane Street Bridge in Seattle and south of Eleventh Street Bridge in any of the Tacoma waterways. Any vessel movements required to transit through bridges shall have an additional charge of \$176.00 per bridge.
(The above charges shall not apply to transit of vessels from Shilshole Bay to the limits of Lake Washington.)

Two or three pilots required:
In a case where two or three pilots are employed for a single vessel waterway or bridge transit, the second and/or third pilot charge shall include the bridge and waterway charge in addition to the harbor shift rate.

Compass adjustment \$250.00
Radio direction finder calibration \$250.00
Launching vessels 377.00
Trial trips, 6 hours or less (Minimum \$708.00) \$118.00 per hr.

Trial trips, over 6 hours (two pilots) \$236.00 per hr.

Shilshole Bay — Salmon Bay \$147.00
Salmon Bay — Lake Union \$115.00
Lake Union — Lake Washington (plus LOA zone from Webster Point) \$147.00

Cancellation charge LOA Zone I
Cancellation charge — Port Angeles (when a pilot is ordered and vessel proceeds to a port outside the Puget Sound pilotage district without stopping for pilot or when a pilot order is cancelled less than twelve hours prior to the original ETA.) LOA Zone II

Docking delay after anchoring: \$118.00 per hr.
Applicable harbor shift rate to apply, plus \$118.00 per hour standby. No charge if delay is 60 minutes or less. If the delay is more than 60 minutes, charge is \$118.00 for every hour or fraction thereof.

Sailing delay: \$118.00 per hour
No charge if delay is 60 minutes or less. If the delay is more than 60 minutes, charge is \$118.00 for every hour or fraction thereof.

Slowdown: \$118.00 per hour
When a vessel chooses not to maintain its normal speed capabilities for reasons determined by the vessel and not the pilot, and when the difference in arrival time is one hour, or greater, from the predicted arrival time had the vessel maintained its normal speed capabilities, a charge of \$118.00 per hour, and each fraction thereof, will be assessed for the resultant difference in arrival time.

Tonnage charges:
0 to 20,000 gross tons:
Additional charge to LOA zone mileage of \$0.0060 a gross ton for all gross tonnage up to 20,000 gross tons.

20,000 to 50,000 gross tons:
Additional charge to LOA zone mileage of \$0.0608 a gross ton for all gross tonnage in excess of 20,000 gross tons up to 50,000 gross tons.

50,000 gross tons and up:
In excess of 50,000 gross tons, the charge shall be \$0.0727 per gross ton.

For vessels where a certificate of international gross tonnage is required, the appropriate international gross tonnage shall apply.

Delayed arrival-Port Angeles: \$118.00 per hour

When a pilot is ordered for an arriving inbound vessel at Port Angeles and the vessel does not arrive within two hours of its ETA, or its ETA is amended less than six hours prior to the original ETA, a charge of \$118.00 for each hour delay, or fraction thereof, shall be assessed in addition to all other appropriate charges.

When a pilot is ordered for an arriving inbound vessel at Port Angeles and the ETA is delayed to six hours or more beyond the original ETA, a cancellation charge shall be assessed, in addition to all other appropriate charges, if the ETA was not amended at least twelve hours prior to the original ETA.

Transportation to vessels on Puget Sound:

March Point or Anacortes	\$144.00
Bangor	84.00
Bellingham	158.00
Bremerton	44.00
Cherry Point	175.00
Dupont	85.00
Edmonds	27.00
Everett	52.00
Ferndale	173.00
Manchester	66.00
Mukilteo	52.00
Olympia	108.00
Point Wells	27.00
Port Gamble	77.00
Port Townsend (Indian Island)	109.00
Seattle	15.00
Semiahmoo (Blaine)	196.00
Tacoma	56.00
Tacoma Smelter	66.00
Winslow	42.00

- (a) Intraharbor transportation for the Port Angeles port area - transportation between Port Angeles pilot station and Port Angeles harbor docks - \$15.00.
- (b) Interport shifts: Transportation paid to and from both points.
- (c) Intraharbor shifts: Transportation to be paid both ways. If intraharbor shift is cancelled on or before scheduled reporting time, transportation paid one way only.
- (d) Cancellation: Transportation both ways unless notice of cancellation is received prior to scheduled reporting time in which case transportation need only be paid one way.
- (e) Any new facilities or other seldom used terminals, not covered above, shall be based on mileage x \$1.80 per mile.

Delinquent payment charge: 1 1/2% per month after 45 days from first billing.

Nonuse of pilots: Ships taking and discharging pilots without using their services through all Puget Sound and adjacent inland waters shall pay full pilotage fees on the LOA zone mileage basis from Port Angeles to destination, from place of departure to Port Angeles, or for entire distance between two ports on Puget Sound and adjacent inland waters.

LOA rate schedule

The following rate schedule is based upon distances furnished by National Oceanic and Atmospheric Administration, computed

to the nearest half-mile and includes retirement fund contributions.

LOA	ZONE	ZONE	ZONE	ZONE	ZONE	ZONE
	I	II	III	IV	V	VI
	Intra Harbor	0-30 Miles	31-50 Miles	51-75 Miles	76-100 Miles	101 Miles & Over
Up to 449	176	275	478	715	966	1256
450 - 459	182	282	481	726	981	1262
460 - 469	186	285	488	738	996	1266
470 - 479	191	293	494	753	999	1269
480 - 489	196	299	496	768	1005	1275
490 - 499	199	302	502	781	1016	1281
500 - 509	209	307	511	791	1024	1290
510 - 519	212	314	516	802	1035	1294
520 - 529	215	325	524	806	1044	1306
530 - 539	223	330	531	815	1061	1319
540 - 549	226	335	542	824	1078	1331
550 - 559	230	345	546	837	1085	1344
560 - 569	238	359	556	844	1097	1358
570 - 579	244	363	560	847	1108	1366
580 - 589	255	370	573	854	1115	1381
590 - 599	266	377	576	858	1131	1396
600 - 609	275	388	584	861	1144	1403
610 - 619	292	392	594	865	1157	1416
620 - 629	303	397	601	875	1169	1432
630 - 639	319	405	608	877	1178	1445
640 - 649	332	414	614	880	1191	1456
650 - 659	355	422	625	887	1205	1470
660 - 669	362	426	630	891	1217	1482
670 - 679	375	437	637	906	1231	1490
680 - 689	381	446	645	917	1242	1506
690 - 699	392	453	654	933	1256	1536
700 - 719	410	467	667	942	1279	1554
720 - 739	435	481	684	956	1306	1581
740 - 759	453	502	698	966	1331	1609
760 - 779	471	521	713	981	1358	1630
780 - 799	494	543	726	996	1381	1659
800 - 819	514	560	741	1001	1403	1683
820 - 839	531	579	758	1016	1432	1704
840 - 859	554	604	772	1028	1456	1734
860 - 879	574	625	787	1056	1482	1757
880 - 899	594	644	802	1080	1506	1783
900 - 919	612	663	816	1106	1536	1810
920 - 939	631	684	837	1131	1554	1832
940 - 959	654	702	848	1157	1581	1856
960 - 979	670	723	863	1178	1609	1883
980 - 999	694	741	878	1205	1630	1907
1000 & over	713	766	893	1231	1659	1933

[Statutory Authority: RCW 88.16.035. 96-12-017, § 296-116-300, filed 5/29/96, effective 7/1/96; 95-12-018, § 296-116-300, filed 5/30/95, effective 7/1/95; 94-12-044, § 296-116-300, filed 5/27/94, effective 7/1/94; 93-12-133, § 296-116-300, filed 6/2/93, effective 7/3/93; 92-14-007, § 296-116-300, filed 6/19/92, effective 7/20/92; 91-11-074, § 296-116-300, filed 5/20/91, effective 6/20/91; 90-20-116, § 296-116-300, filed 10/2/90, effective 11/2/90; 90-08-095, § 296-116-300, filed 4/4/90, effective 5/5/90; 89-08-041 (Order 89-2, Resolution No. 89-2), § 296-116-300, filed 3/31/89. Statutory Authority: RCW 88.16.050. 88-05-039 (Order 88-1, Resolution No. 88-1), § 296-116-300, filed 2/16/88, effective 3/18/88. Statutory Authority: RCW 88.16.035(4). 87-01-081 (Orders 86-9 and 86-10, Resolution Nos. 86-9 and 86-10), § 296-116-300, filed 12/19/86; 86-19-066 (Order 86-6, Resolution No. 86-6), § 296-116-300, filed 9/16/86; 86-02-035 (Order 86-1, Resolution No. 86-1), § 296-116-300, filed 12/30/85; 85-02-048 (Order 84-5, Resolution No. 84-5), § 296-116-300, filed 12/31/84; 84-04-006 (Order 84-1, Resolution No. 84-1), § 296-116-300, filed 1/20/84; 83-17-055 (Order 83-6, Resolution No. 83-6), § 296-116-300, filed 8/17/83; 82-13-065 (Order 82-4, Resolution No. 82-4), § 296-116-300, filed 6/16/82. Statutory Authority: RCW 88.16.035. 81-12-017 (Order 81-2, Resolution No. 81-2), § 296-116-300, filed 5/29/81; 80-06-084 (Order 80-1, Resolution No. 80-1), § 296-116-300, filed 5/28/80. Statutory Authority: RCW 88.16.035(4). 79-07-033 (Order 79-4, Resolution No. 79-4), § 296-116-300,

filed 6/19/79. Statutory Authority: Chapter 88.16 RCW and 1977 ex. sess. c 337, §§ 1 and 4. 78-02-008 (Order 78-1), § 296-116-300, filed 1/6/78, effective 2/10/78; Order 77-18, § 296-116-300, filed 9/20/77, effective 11/1/77; Order 76-24, § 296-116-300, filed 7/22/76; Order 75-3, § 296-116-300, filed 2/10/75; Order 74-2, § 296-116-300, filed 1/8/74; Order 73-8, § 296-116-300, filed 6/20/73 and Emergency Order 73-10, filed 7/19/73, effective 8/14/73; Order 70-7, § 296-116-300, filed 7/16/70; 7/25/67; 2/18/64; 10/29/62; 12/28/60; 3/23/60.]

WAC 296-116-315 Retirement disbursements. Pilot associations having retirement plans, the expense of which is reimbursed through board established tariffs, shall make such payments to retired pilots as are required by the benefits and enforcement provisions of those plans.

[Statutory Authority: RCW 88.16.035. 91-06-033, § 296-116-315, filed 2/26/91, effective 3/29/91.]

WAC 296-116-35001 Exemption from provisions of WAC 197-10-800. The board of pilotage commissioners of the state of Washington has reviewed its authorized activities and found substantially all of them to be exempt from the provisions of chapter 197-10 WAC, with the exception of authority supplied by the 1975 legislature to the commission respecting additional tug shaft horsepower equivalencies which is a part of the "tug escort" 1975 amendments by chapter 125, Laws of 1975 1st ex. sess.

There is presently no intent to exercise this authority. Additionally, said act is currently under constitutional challenge. Thus, the commission indicates its intent that if, and when, any authority should be exercised pursuant to this provision, it would do so consistent with the guidelines contained within chapter 197-10 WAC insofar as practicable. (The referenced chapter being the regulations developed by the council on environmental policy.)

[Order 76-14, § 296-116-350 (codified as WAC 296-116-35001), filed 5/6/76.]

WAC 296-116-360 Exempt vessels. Under the authority of RCW 88.16.070, application may be made to the board of pilotage commissioners to seek exemption from the pilotage requirements for the operation of a limited class of small passenger vessels or yachts, which are not more than five hundred gross tons (international), do not exceed two hundred feet in length, and are operated exclusively in the waters of the Puget Sound pilotage district and lower British Columbia. The owners or operators of such vessel or vessels must:

- (1) Seek exemption at least sixty days prior to planned vessel operations in the Puget Sound pilotage district.
- (2) Submit the petition requesting exemption to the chairperson, Washington state board of pilotage commissioners, with details concerning description of the vessel, the contemplated use of vessel, the proposed area of operation, the name and address of the vessel's owner, and the dates of planned operations. The board shall hold a hearing at a regularly scheduled board meeting to consider such exemption request.

The board, when granting such an exemption, may establish such conditions they deem necessary so that such an exemption shall not be detrimental to the public interest in regard to safe operation preventing loss of human lives,

loss of property, and protecting the marine environment of the state of Washington.

One such condition shall be that the master of the vessel, shall at all times, hold as a minimum, a United States government license as a master of ocean or near coastal steam or motor vessels of not more than sixteen hundred gross tons or as a master of inland steam or motor vessels of not more than five hundred gross tons, such license to include a current radar endorsement.

The board shall annually, or at any other time when in the public interest, review any exemptions granted to the specified class of small vessels to ensure that each exempted vessel remains in compliance with the original exemption and any conditions to the exemption. The board shall have the authority to revoke such exemption when there is not continued compliance with the requirements for exemption.

[Statutory Authority: RCW 88.16.070. 93-07-077, § 296-116-360, filed 3/18/93, effective 4/18/93; 90-20-039, § 296-116-360, filed 9/25/90, effective 10/26/90; 88-09-015 (Order 88-6, Resolution No. 88-6), § 296-116-360, filed 4/13/88.]

WAC 296-116-370 System of specified disciplinary or corrective actions. When a pilot has received multiple disciplinary actions pursuant to RCW 88.16.100 (1) and/or (2) within any two-year period, the board shall evaluate the pilot and prepare and personally serve upon him a notice advising of the board's intended action, the specific ground therefore, and the right to request a hearing pursuant to RCW 88.16.100(4) to challenge the board's action. Such intended action may include the temporary suspension of the pilot from duties until such pilot has satisfactorily completed subsection (1) or (2) of this section:

(1) An approved course-of-study which may include navigation training and testing; or

(2) Any remedial activity or treatment designated by the board to assure fitness and competence for full pilotage duties.

In ordering such disciplinary action, the board shall take into account both the causes of the previous disciplinary actions and the pilot's previous record.

Failure to enter into such corrective action within thirty days of the board's action may be cause for revocation of the pilot's license.

In the event of a temporary license suspension, license reinstatement and resumption of pilotage duties shall not be authorized until the board has reviewed completed activity and formally extended approval. Such approval shall not be unreasonably withheld by the board and shall be reviewed and acted upon within five days of the completion of the activity.

[Statutory Authority: RCW 88.16.100. 88-14-062 (Order 88-14, Resolution No. 88-14), § 296-116-370, filed 7/1/88.]

WAC 296-116-400 Procedure for request by steamship company or agent that certain pilots not be assigned to certain vessels for specific safety reasons. When a steamship company or agent believes a particular pilot should not be assigned to pilot that company's vessels for specific safety reasons, a detailed written request, limited to specific safety concerns, may be submitted to the board. In order to be considered, the request must be submitted

within ten days of the alleged act or omission causing their specific safety concern.

The board shall investigate the request and shall conduct a hearing at a regularly scheduled board meeting not more than sixty days following receipt of the request and notification of interested persons. The pilot shall be notified in writing and provided with documentation in accordance with WAC 296-11-450. The board shall notify the steamship company or agent and pilot in writing of its subsequent decision and reasons therefore.

In the event that the request is approved, the board shall give the affected pilot a specific list of vessels for which that pilot shall not provide pilotage services as well as the length of time covering such restriction.

[Statutory Authority: RCW 88.16.035. 88-09-016 (Order 88-7, Resolution No. 88-7), § 296-116-400, filed 4/13/88.]

WAC 296-116-410 Definition of Grays Harbor pilotage district. The Grays Harbor pilotage district shall have an outer boundary line between Grays Harbor and Willapa Harbor and the high seas which shall be seaward of a line from Point Brown rear range light to Grays Harbor entrance lighted whistle buoy number three, (latitude N 46-55.00, longitude 124-14.42 W), thence to Grays Harbor entrance lighted whistle buoy number two (latitude N 46-52.43, longitude 124-12.35 W), thence to Grays Harbor light and from the Willapa Bay light to the Willapa Bay approach lighted whistle buoy "W" (latitude N 46-41.50, longitude 124-10.46 W), thence to the charted northernmost position of Leadbetter Point.

[Statutory Authority: RCW 88.16.050. 88-09-017 (Order 88-8, Resolution No. 88-8), § 296-116-410, filed 4/13/88.]

WAC 296-116-420 Summary/temporary license suspension. Summary/temporary suspension of a pilot's license may be made by the chairperson or vice-chairperson of the board of pilotage commissioners when:

(1) A pilot has been involved in any vessel accident where there has been major property damage, loss of life, or loss of a vessel; or

(2) Where there is a reasonable cause to believe that a pilot has diminished capacity or is under the influence of drugs, alcohol, or other substances; and

(3) Such an accident or physical or mental impairment would significantly diminish that pilot's ability to carry out pilotage duties and that the public health, safety, and welfare requires such emergency action. Notification of this suspension shall be made directly to the pilot and the appropriate pilot's association.

Within seventy-two hours an emergency board meeting will be held to determine whether to continue such suspension. In the event the suspension is continued pending proceedings for revocation or other action, an order shall be immediately prepared and notice shall be personally served upon the pilot advising of the board's action.

These further proceedings shall be promptly instituted in the office of administrative hearings.

All final decisions of the administrative law judge shall be subject to review by the superior court of the state of Washington for Thurston County or by the superior court of the county in which the pilot maintains his residence or

principal place of business, to which court any case with all the papers and proceedings therein shall be immediately certified by the administrative law judge if requested to do so by any party to the proceedings at any time within thirty days after the date of such final decision. No appeal may be taken after the expiration of thirty days after the date of final decision.

[Statutory Authority: RCW 88.16.100. 88-10-040 (Order 88-12, Resolution No. 88-12), § 296-116-420, filed 5/3/88.]

WAC 296-116-500 Tug escort requirements for oil tankers. (1) RCW 88.16.190(2) requires the escort of a tug or tugs for all oil tankers 40,000 DWT or greater when not in ballast. For purposes of that provision only, deadweight tonnage shall be the maximum summer deadweight tonnage that was assigned to the vessel at the time of construction as reported in **Lloyd's Register of Ships**. Unless the vessel was structurally altered and remeasured to less than 40,000 DWT, this original deadweight tonnage shall be used for purposes of determining if the vessel requires the appropriate tug escort.

(2) It shall be a violation of this regulation to provide pilotage services to an oil tanker not in compliance with this rule when the pilot has actual knowledge of the noncompliance.

(3) Oil tankers found to be in violation of the provisions of this regulation shall be subject to the provisions of RCW 88.16.150.

(4) The deadweight tonnage provision of this rule is to be used solely for determining the required use of a tug escort.

[Statutory Authority: RCW 88.16.190(2). 94-07-079, § 296-116-500, filed 3/16/94, effective 4/16/94.]

Chapter 296-124 WAC

RULES AND REGULATIONS FOR THE ADMINISTRATION OF THE THEATRICAL ENTERPRISE ACT

WAC

296-124-010	Definitions.
296-124-020	Bond or cash deposit.
296-124-021	Statement of intent to hire.
296-124-022	Filing claim for wages against bond or cash deposit.
296-124-040	Multiple events.
296-124-050	Failure to post bond.

WAC 296-124-010 Definitions. As used in this chapter:

(1) "Theatrical enterprise" means the production of any circus, vaudeville, carnival, revue, variety show, musical comedy, operetta, opera, drama, endurance contest, marathon, walkathon, or any other entertainment event where persons are a part of the enterprise's presentation. Theatrical enterprise does not include a program of a radio or television station operating pursuant to a license issued by the Federal Communications Commission or any event produced by a nonprofit cultural or artistic organization that has been located in a community for at least two years.

(2) "Department" means the department of labor and industries.

(3) "Director" means the director of the department of labor and industries or his duly authorized deputy or representative.

(4) "Assistant director" means the supervisor of industrial relations for the department of labor and industries or his duly authorized deputy or representative.

(5) "Promoter" includes any individual, firm, partnership, association or corporation giving employment to individuals involved with the production of a theatrical enterprise.

(6) "Employee" means an employee who is employed in the business of his employer whether by way of manual labor or otherwise.

[Statutory Authority: RCW 49.38.070. 85-03-065 (Order 85-4), § 296-124-010, filed 1/16/85.]

WAC 296-124-020 Bond or cash deposit. (1) Any persons engaged in the business of promoting a theatrical enterprise in this state shall deposit with the department the cash or bond issued by a surety company authorized to do business in this state in an amount determined sufficient by the department to pay the wages of every person involved in the production of the theatrical enterprise for the period for which a single payment of wages is made, but not to exceed one week.

(2) The deposit required under subsection (1) of this section shall be on file with the department seven calendar days before the commencement of the theatrical enterprise.

(3) The deposit required under subsection (1) shall be in existence for a period of at least one year after conclusion of the event.

(4) A cash deposit may be made with the department in lieu of a bond.

(5) An assigned savings account may be left with the department in lieu of the bond.

[Statutory Authority: RCW 49.38.070. 85-03-065 (Order 85-4), § 296-124-020, filed 1/16/85.]

WAC 296-124-021 Statement of intent to hire. In addition to the bond or cash deposit there shall be filed, on a form supplied by the department, a notarized statement of intent to hire which shall include:

(1) Name and address (current and permanent) of the person(s) promoting the theatrical enterprise.

(2) The promoters' bank account location.

(3) Proof of the promoters' industrial insurance coverage for workers.

(4) Name of event sponsor, if applicable.

(5) Date, time period and location of event.

(6) Classification of workers employed.

(7) Approximate number of workers and hourly rate to be paid each classification of workers.

(8) Total estimate of weekly payroll for the event.

(9) Copy of this intent shall be on file at the site of the event.

[Statutory Authority: RCW 49.38.070. 85-03-065 (Order 85-4), § 296-124-021, filed 1/16/85.]

WAC 296-124-022 Filing claim for wages against bond or cash deposit. An employee may make claim against bond or cash deposit by:

(1) Filing suit in superior or district court in the county where the event was performed or where employer or principle owner resides; and,

(2) The employee shall file notice of court action with the department within 20 days of the conclusion of the suit; or,

(3) An employee may file a wage claim assignment with the department in accordance with RCW 49.48.040 within 90 days of the conclusion of the event.

[Statutory Authority: RCW 49.38.070. 85-03-065 (Order 85-4), § 296-124-022, filed 1/16/85.]

WAC 296-124-040 Multiple events. In the case of multiple events only one bond or cash deposit and statement of intent to hire must be filed by the promoter, providing that the bond or cash deposit and other information required by this chapter is sufficient for all events covered.

[Statutory Authority: RCW 49.38.070. 85-03-065 (Order 85-4), § 296-124-040, filed 1/16/85.]

WAC 296-124-050 Failure to post bond. Failure to conform with provisions of these regulations may result in the department bringing legal action to cause compliance and/or the closure of the business.

[Statutory Authority: RCW 49.38.070. 85-03-065 (Order 85-4), § 296-124-050, filed 1/16/85.]

Chapter 296-125 WAC

NONAGRICULTURAL EMPLOYMENT OF MINORS

WAC

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DISPOSITION OF SECTIONS FORMERLY CODIFIED IN THIS CHAPTER

296-125-023	Posting. [Order 76-15, § 296-125-023, filed 5/17/76.] Repealed by 93-01-068, filed 12/11/92, effective 3/1/93. Statutory Authority: Chapters 43.22 and 49.12 RCW, RCW 26.28.060 and 43.17.060.
296-125-025	Conditions governing issuance of permits. [Order 74-9, § 296-125-025, filed 3/13/74, effective 4/15/74; Order 71-5, § 296-125-025, filed 5/26/71, effective 7/1/71; Section D, filed 9/18/63; Rules (part), filed 3/12/60.] Repealed by Order 76-15, filed 5/17/76.
296-125-035	Working conditions. [Section F, filed 9/18/63; Rules (part), filed 3/23/60.] Repealed by Order 71-5, filed 5/26/71, effective 7/1/71.
296-125-040	Issuance of permit. [Order 71-5, § 296-125-040, filed 5/26/71, effective 7/1/71; Section G, filed 9/18/63; Rules

(part), filed 3/23/60.] Repealed by Order 76-15, filed 5/17/76.

296-125-045	Denial of permit. [Order 71-5, § 296-125-045, filed 5/26/71, effective 7/1/71; Section H, filed 9/18/63.] Repealed by Order 76-15, filed 5/17/76.
296-125-055	Revocation of permits. [Order 76-15, § 296-125-055, filed 5/17/76; Order 71-5, § 296-125-055, filed 5/26/71, effective 7/1/71; Section J, filed 9/18/63; Rules (part), filed 3/23/60.] Repealed by 93-01-068, filed 12/11/92, effective 3/1/93. Statutory Authority: Chapters 43.22 and 49.12 RCW, RCW 26.28.060 and 43.17.060.
296-125-110	Applicability. [Statutory Authority: RCW 43.22.270 and 1989 c 216. 89-23-003, § 296-125-110, filed 11/3/89, effective 11/20/89.] Repealed by 93-01-068, filed 12/11/92, effective 3/1/93. Statutory Authority: Chapters 43.22 and 49.12 RCW, RCW 26.28.060 and 43.17.060.
296-125-115	Definitions. [Statutory Authority: RCW 43.22.270 and 1989 c 216. 89-23-003, § 296-125-115, filed 11/3/89, effective 11/20/89.] Repealed by 93-01-068, filed 12/11/92, effective 3/1/93. Statutory Authority: Chapters 43.22 and 49.12 RCW, RCW 26.28.060 and 43.17.060.
296-125-120	Filing of registration certificate. [Statutory Authority: RCW 43.22.270 and 1989 c 216. 89-23-003, § 296-125-120, filed 11/3/89, effective 11/20/89.] Repealed by 93-01-068, filed 12/11/92, effective 3/1/93. Statutory Authority: Chapters 43.22 and 49.12 RCW, RCW 26.28.060 and 43.17.060.
296-125-125	Application for initial and renewed registration. [Statutory Authority: RCW 43.22.270 and 1989 c 216. 89-23-003, § 296-125-125, filed 11/3/89, effective 11/20/89.] Repealed by 93-01-068, filed 12/11/92, effective 3/1/93. Statutory Authority: Chapters 43.22 and 49.12 RCW, RCW 26.28.060 and 43.17.060.
296-125-130	Posting. [Statutory Authority: RCW 43.22.270 and 1989 c 216. 89-23-003, § 296-125-130, filed 11/3/89, effective 11/20/89.] Repealed by 93-01-068, filed 12/11/92, effective 3/1/93. Statutory Authority: Chapters 43.22 and 49.12 RCW, RCW 26.28.060 and 43.17.060.
296-125-135	Identification cards. [Statutory Authority: RCW 43.22.270 and 1989 c 216. 89-23-003, § 296-125-135, filed 11/3/89, effective 11/20/89.] Repealed by 93-01-068, filed 12/11/92, effective 3/1/93. Statutory Authority: Chapters 43.22 and 49.12 RCW, RCW 26.28.060 and 43.17.060.
296-125-140	House to house employment standards. [Statutory Authority: RCW 43.22.270 and 1989 c 216. 89-23-003, § 296-125-140, filed 11/3/89, effective 11/20/89.] Repealed by 93-01-068, filed 12/11/92, effective 3/1/93. Statutory Authority: Chapters 43.22 and 49.12 RCW, RCW 26.28.060 and 43.17.060.
296-125-145	Transporting minors out-of-state. [Statutory Authority: RCW 43.22.270 and 1989 c 216. 89-23-003, § 296-125-145, filed 11/3/89, effective 11/20/89.] Repealed by 93-01-068, filed 12/11/92, effective 3/1/93. Statutory Authority: Chapters 43.22 and 49.12 RCW, RCW 26.28.060 and 43.17.060.
296-125-155	Recordkeeping. [Statutory Authority: RCW 43.22.270 and 1989 c 216. 89-23-003, § 296-125-155, filed 11/3/89, effective 11/20/89.] Repealed by 93-01-068, filed 12/11/92, effective 3/1/93. Statutory Authority: Chapters 43.22 and 49.12 RCW, RCW 26.28.060 and 43.17.060.
296-125-160	Revocation of registration certificate. [Statutory Authority: RCW 43.22.270 and 1989 c 216. 89-23-003, § 296-125-160, filed 11/3/89, effective 11/20/89.] Repealed by 93-01-068, filed 12/11/92, effective 3/1/93. Statutory Authority: Chapters 43.22 and 49.12 RCW, RCW 26.28.060 and 43.17.060.
296-125-165	Denial of registration certificate. [Statutory Authority: RCW 43.22.270 and 1989 c 216. 89-23-003, § 296-125-165, filed 11/3/89, effective 11/20/89.] Repealed by 93-01-068, filed 12/11/92, effective 3/1/93. Statutory Authority: Chapters 43.22 and 49.12 RCW, RCW 26.28.060 and 43.17.060.
296-125-170	Employment of minors under the age of sixteen. [Statutory Authority: RCW 43.22.270 and 1989 c 216. 89-23-003, § 296-125-170, filed 11/3/89, effective 11/20/89.]

Repealed by 93-01-068, filed 12/11/92, effective 3/1/93. Statutory Authority: Chapters 43.22 and 49.12 RCW, RCW 26.28.060 and 43.17.060.

296-125-175

Length of registration period. [Statutory Authority: RCW 43.22.270 and 1989 c 216. 89-23-003, § 296-125-175, filed 11/3/89, effective 11/20/89.] Repealed by 93-01-068, filed 12/11/92, effective 3/1/93. Statutory Authority: Chapters 43.22 and 49.12 RCW, RCW 26.28.060 and 43.17.060.

WAC 296-125-010 Applicability. This chapter applies to every person that employs one or more minors, or who permits, allows, or suffers one or more minors to work at a site or workplace, on premises, or under work conditions controlled by that employer, except for those employers statutorily exempted, as follows: This chapter does not apply to newspaper vendors or carriers; to domestic or casual labor in or about private residences; to parents or stepparents who employ their own children for house-to-house sales; to agricultural labor as defined by RCW 50.04.150; or, to employers expressly exempted by federal statute from the coverage of state law.

[Statutory Authority: Chapters 43.22 and 49.12 RCW, RCW 26.28.060 and 43.17.060. 93-01-068, § 296-125-010, filed 12/11/92, effective 3/1/93; Order 76-15, § 296-125-010, filed 5/17/76; Order 74-9, § 296-125-010, filed 3/13/74, effective 4/15/74; Order 71-5, § 296-125-010, filed 5/26/71, effective 7/1/71; Section A, filed 9/18/63; Rules (part), filed 3/23/60.]

WAC 296-125-015 Definitions. For the purposes of this chapter:

(1) "Department" means the Washington state department of labor and industries.

(2) "Employ" means to engage, suffer or permit to work, and includes entering into any arrangement, including a contract, whether implied, express, oral, or written, with a minor whereby the minor works in house-to-house sales except when a minor is working in house-to-house sales for her or his parent or stepparent. The term "employ" does not include newspaper vendors or carriers, the use of domestic or casual labor in or about private residences, agricultural labor as defined by RCW 50.04.150, or the use of voluntary or donated services performed for an educational, charitable, religious, or nonprofit organization and without expectation or contemplation of compensation for the services performed.

(3) "Employee" means any minor employed by an employer, including minors who work pursuant to any arrangement, including contract, whether implied, express, oral, or written in house-to-house sales, but does not include newspaper vendors or carriers, domestic or casual labor in or about private residences, minors employed in agricultural labor as defined by RCW 50.04.150, or minors employed for house-to-house sales by their parents or stepparents.

(4) "Employer" means any person, association, partnership, private or public corporation that employs or exercises control over the wages, hours, working conditions, or workplace of a minor, and for purposes of house-to-house sales includes any distributor or other person, association, partnership, private or public corporation that enters into any arrangement, including contract, whether implied, express, oral, or written, with a minor whereby the minor works in house-to-house sales; but does not include employers of agricultural labor as defined by RCW 50.04.150, employers

of newspaper vendors or carriers, employers of casual labor in or about the employers' private residences, parents or stepparents employing their own minor children for house-to-house sales, the state, a state institution, a state agency, a political subdivision of the state, a municipal corporation, or a quasi-municipal corporation.

(5) "House-to-house sales" means a sale or other transaction in consumer goods, the demonstration of products or equipment, the obtaining of orders for consumer goods, or the obtaining of contracts for services, in which an employee personally solicits the sale or transaction at a place other than the place of business of the employer or the residence of the employee.

(6) "Minor" means a person under the age of eighteen years.

(7) "School holiday" means a day of a school week on which the school at which a minor employee is enrolled is scheduled to be closed. If a minor employee is not enrolled in school, school holidays shall be determined by the schedule of the public school district in which the minor resides.

(8) "School vacation" means the spring break, winter break, and summer break of the school at which a minor employee is enrolled, or if not enrolled the public school district in which a minor resides.

(9) "Transport" means the conveyance, provision of a means of conveyance, or reimbursement or payment for the cost of conveyance at the direction or under the control of an employer or an employer's agent.

(10) "Workplace" means any worksite, premises, or location where minors work.

[Statutory Authority: Chapters 43.22 and 49.12 RCW, RCW 26.28.060 and 43.17.060. 93-01-068, § 296-125-015, filed 12/11/92, effective 3/1/93. Statutory Authority: RCW 43.22.270 and 1989 c 216. 89-23-003, § 296-125-015, filed 11/3/89, effective 11/20/89; Order 76-15, § 296-125-015, filed 5/17/76; Order 74-9, § 296-125-015, filed 3/13/74, effective 4/15/74; Order 71-5, § 296-125-015, filed 5/26/71, effective 7/1/71; Section B, filed 9/18/63; Rules (part), filed 3/23/60.]

WAC 296-125-018 Minimum age for employment.

(1) Pursuant to RCW 26.28.060, a written order issued by a judge of a superior court of the county in which a minor lives is a prerequisite to the hiring, not otherwise prohibited by federal law, of any minor under the age of fourteen for any labor in or in connection with any store, shop, factory, mine, or inside employment other than inside employment connected with farm or housework.

(2) No employer shall employ a minor under the age of sixteen in house-to-house sales, unless the department has granted a variance to an employer for that specific purpose.

[Statutory Authority: Chapters 43.22 and 49.12 RCW, RCW 26.28.060 and 43.17.060. 93-01-068, § 296-125-018, filed 12/11/92, effective 3/1/93.]

WAC 296-125-019 Prerequisites to employing minors. Prior to hiring a minor or allowing a minor to work, an employer that seeks to employ one or more minors must:

(1) Obtain, maintain, and post a valid minor work permit from the department of labor and industries for each workplace at which minors will be employed, pursuant to WAC 296-125-020.

(2) If employing minors for house-to-house sales:

(a) Obtain and maintain a valid house-to-house sales registration certificate from the department of labor and industries, pursuant to WAC 296-125-024, in addition to a minor work permit, and in addition to parent/school authorization forms pursuant to WAC 296-125-026 (see subsection (3) of this section);

(b) If the employer seeks to transport a minor out of the state of Washington for house-to-house sales, obtain and keep on file express written authorization from each minor's parent or legal guardian to transport each minor worker out of the state for house-to-house sales;

(c) Obtain from the department and issue valid identification cards with photographs for each minor employee, pursuant to WAC 296-125-024.

(3) Obtain and keep on file at the minor's workplace(s) a completed parent/school authorization form for each minor, pursuant to WAC 296-125-026. In the case of minors employed for house-to-house sales, the forms shall be kept on file at the employer's primary place of business within the state of Washington.

(4) Keep on file at the minor's workplace(s) any variances issued pursuant to WAC 296-125-060 or 296-125-070.

[Statutory Authority: Chapters 43.22 and 49.12 RCW, RCW 26.28.060 and 43.17.060. 93-01-068, § 296-125-019, filed 12/11/92, effective 3/1/93.]

WAC 296-125-020 Minor work permits. (1) Issuance. Each employer shall receive from the department, and shall maintain, a valid minor work permit prior to employing a minor, or prior to allowing a minor to work at a workplace or under work conditions controlled by the employer. Permits may include restrictions, consistent with this chapter, on minor employees' working conditions. A valid minor work permit must remain in full force and effect at all times that minors are employed by, or are working at a workplace or under work conditions controlled by, the employer.

Separate permits shall be obtained and maintained by each employer for each workplace where minors are employed. In instances where an employer places minor workers in a workplace controlled by another employer, both or all employers shall obtain and maintain minor work permits covering that workplace prior to the employment of minors in that workplace. In instances where an employer employs minor workers in multiple workplaces, the employer shall obtain and maintain a minor work permit covering each workplace. When duly issued by the department, and unless modified or revoked, such a permit will authorize an employer to employ any number of minor workers in the workplace specified, in accordance with the provisions of this chapter and with any limitations listed on the permit.

(2) Posting. At least one copy of a valid permit to employ minors must be posted in plain view of all employees at each workplace specified in the permit. In the case of employers of minors employed in house-to-house sales, the permit shall be posted in plain view of all employees at the employer's primary place of business within the state of Washington.

(3) Renewal. Minor work permits shall be valid for a one-year period. Filing of an application for renewal of a permit does not result in an automatic extension of the one-

year period. The department may refuse to renew a minor work permit if the department finds that a condition of the previous permit period has not been satisfied, that the employer has violated the requirements of this chapter, or that any other condition exists that is or could be detrimental to the health, safety, or welfare of a minor.

(4) Revocation, suspension, and modification. The department may revoke, suspend, or modify an employer's permit to employ minors if the department finds that a condition of the permit's issuance is not being satisfied, that the employer has violated the requirements of this chapter, or that any other condition exists which is or could be detrimental to the health, safety, or welfare of a minor. In the event the department finds that a condition exists which is or could be detrimental to the health, safety, or welfare of a minor, the department may issue an order of immediate restraint; in such instances, an appeal of the department's action shall not stay the revocation, suspension, or modification during the pendency of the appeal.

(5) Appeals. An appeal of an action by the department to refuse to issue or renew, or to revoke, suspend, or modify an employer's minor work permit must be filed in writing with the department within thirty days of the department's action, pursuant to the procedures established by RCW 49.12.161 and 49.12.400. Such appeal shall not stay the effectiveness of an order of immediate restraint issued by the department pursuant to RCW 49.12.390.

[Statutory Authority: Chapters 43.22 and 49.12 RCW, RCW 26.28.060 and 43.17.060. 93-01-068, § 296-125-020, filed 12/11/92, effective 3/1/93; Order 76-15, § 296-125-020, filed 5/17/76; Order 71-5, § 296-125-020, filed 5/26/71, effective 7/1/71; Section C, filed 9/18/63; Rules (part), filed 3/23/60.]

WAC 296-125-024 House-to-house sales. (1) Minimum age. No minor under the age of sixteen years may be employed in house-to-house sales, unless the department grants a variance to an employer for that specific purpose. A variance must be obtained prior to an employer's employment of any minor under the age of sixteen.

(2) Registration certificates. Each employer of minors in house-to-house sales, or person seeking to advertise to employ a person in house-to-house sales with an advertisement specifically stating a minimum age requirement that is under the age of twenty-one, shall receive from the department, and shall maintain, a valid house-to-house sales registration certificate prior to employing a sixteen- or seventeen-year-old minor for house-to-house sales and prior to advertising for employment.

Employers also must obtain and maintain a valid minor work permit, pursuant to WAC 296-125-020, and parent/school authorization forms, pursuant to WAC 296-125-126, prior to employing minors for house-to-house sales. If an employer seeks to transport a minor out of the state of Washington for house-to-house sales, the employer must obtain and keep on file express written authorization from each minor's parent or legal guardian to transport each minor worker out of the state for house-to-house sales.

A valid registration certificate and a valid minor work permit must remain in full force and effect at all times that minors are employed by the employer. When duly issued by the department, and unless modified, suspended, or revoked,

such a certificate will authorize the employer to employ any number of sixteen- or seventeen-year-old minors for house-to-house sales in accordance with the provisions of this chapter and in accordance with any limitations listed on the certificate.

(3) Adult supervision requirements.

(a) The employer shall ensure that there is one adult supervisor for every five minor employees employed in house-to-house sales during all work hours. A supervisor may not supervise more than one group of five minor employees.

(b) The employer shall ensure that each supervisor of minor employees is a responsible adult who is at least twenty-one years of age.

(c) The employer shall ensure that each supervisor has contact, personally or verbally, with each minor employee at least once every fifteen minutes. The contact with minor employees may be made by remote means such as telephone or walkie-talkie, but in any case shall be of such a nature as to provide assurance of the minor's health, safety, and welfare. The employer shall ensure that each supervisor is within one-half mile of each supervised minor employee during all working hours.

(d) The employer shall ensure that each minor employee is returned by the employer or its agent to the minor's home or initial point of contact promptly at the end of the minor's work hours. If the minor is returned to the initial point of contact, the employer shall ensure that the location selected is one in which the minor's safety is the first and foremost consideration. Minors shall be protected from risks of injury including, but not limited to, moving vehicles.

(4) Hours restrictions and rest periods. Minors may not be employed in house-to-house sales prior to 7:00 a.m. or after 9:00 p.m., nor during school hours. In addition, employers of minors in house-to-house sales must comply with the further requirements of WAC 296-125-027, concerning maximum number of hours per day and per week, and WAC 296-125-028, concerning mandatory rest and meal breaks.

(5) Employee identification cards.

(a) An employer shall issue to each minor employed in house-to-house sales an identification card with the employee's picture. The identification cards issued shall be exclusively from forms obtained in blank from the department.

(b) An identification card shall be in the possession of each minor employed in house-to-house sales during all working hours, and shall be shown to each customer or potential customer.

(6) Posting. At least one copy of a valid house-to-house sales registration certificate shall be posted in plain view of all employees at the employer's primary place of business within the state of Washington.

(7) Renewal. House-to-house sales registration certificates shall be valid for a one-year period. The filing of an application for renewal of registration does not result in an automatic extension of the one-year registration period. The department may refuse to renew a registration certificate if the department finds that a condition of the previous registration period has not been satisfied, that the employer has violated the requirements of this chapter, or that any other condition exists that is or could be detrimental to the health, safety, or welfare of a minor.

(8) Revocation, suspension, and modification. The department may revoke, suspend, or modify an employer's registration for house-to-house sales if the department finds that a condition of registration is not being satisfied, that the employer has violated the requirements of this chapter, or that any other condition exists which is or could be detrimental to the health, safety, or welfare of a minor. In the event the department finds that a condition exists which is or could be detrimental to the health, safety, or welfare of a minor, the department may take emergency action to revoke or suspend a house-to-house sales registration; in such instances, an appeal of the department's action shall not stay the revocation, suspension, or modification during the pendency of the appeal.

(9) Appeals. An appeal of an action by the department to refuse to issue or renew, or to revoke, suspend, or modify an employer's house-to-house sales registration must be filed in writing with the director of the department within thirty days of the department's action. Such appeal shall be conducted in accordance with the rules of practice and procedure established in chapter 296-10 WAC. Such appeal shall not stay the effectiveness of an emergency action taken by the department pursuant to this section.

[Statutory Authority: Chapters 43.22 and 49.12 RCW, RCW 26.28.060 and 43.17.060. 93-01-068, § 296-125-024, filed 12/11/92, effective 3/1/93.]

WAC 296-125-026 Parent/school authorization forms. Prior to allowing a minor employee to work, an employer shall obtain a fully completed parent/school authorization form, as further provided by this section, and shall keep a copy of the completed form at the minor employee's workplace(s) at all times. In addition, if an employer seeks to transport a minor out of the state of Washington for house-to-house sales, the employer must obtain and keep on file at the employer's primary place of business within the state of Washington express written authorization from each minor's parent or legal guardian to transport each minor worker out of the state for house-to-house sales.

The authorization form used shall be one issued by the department. Each parent/school authorization expires on the thirtieth day of September each year; a newly completed and signed parent/school authorization form must be obtained by an employer for each minor employee prior to that date.

The following persons shall complete and sign the authorization form as follows:

(1) The minor employee shall enter:

(a) Her or his name;

(b) Address;

(c) Date of birth (accompanied by proof);

(d) Whether the minor is employed at any other job, and if so, the total number of hours worked at such job(s); and

(e) Signature.

The minor's date of birth may be proven with one of the following documents: Birth certificate, together with Social Security card; driver's license; baptismal record, together with Social Security card; or, notarized statement of parent or guardian.

(2) The minor employee's employer shall enter on the form:

(a) The location of the minor employee's workplace(s);

(b) A description of the minor employee's duties;

(c) The earliest and latest hours during which the minor employee would be working, and the total number of hours the employee would work per week;

(d) The employer's minor work permit number, minor work permit expiration date, and unified business identifier number;

(e) Description of the minor employee's specific meal and rest breaks; and

(f) The signature of the employer or of the employer's authorized agent.

(3) If the minor employee will be working during a school year:

(a) An authorized school official of the minor employee's school shall indicate that the school authorizes or does not authorize the minor to work according to the terms listed by the employer, and shall sign the form as the school's authorized agent. If a minor employee has been working for an employer during a school vacation and seeks to continue working after the resumption of school, the minor's employer must obtain school authorization at that time. Authorization shall be based on the maintenance of an acceptable record of scholastic achievement, a good attendance record, and satisfactory progress toward graduation.

(b) If a minor is no longer enrolled in school, and has not obtained a certificate of educational competence pursuant to RCW 28A.305.190 or is not enrolled in a bona fide college program:

(i) If the minor is unmarried and living with a parent or legal guardian, the parent or guardian must certify the minor's nonenrolled status;

(ii) If the minor is named on a valid certificate of marriage or is living independently of a parent or legal guardian, the minor must certify this information and her or his nonenrolled status, and must provide the name and location of the last school attended.

(4) A parent or legal guardian of the minor employee shall indicate that she or he authorizes or does not authorize the minor to work according to the terms listed by the employer, and shall sign the form. If the minor is living independently of a parent or legal guardian, the minor must provide the name and address or telephone number of an adult emergency contact. This person must certify that the minor is living independently of a parent or legal guardian. The adult emergency contact person may not be the employer.

If the minor employee is to be employed for house-to-house sales, and is to be transported out of the state for this purpose, this must be expressly stated by the employer and authorized by the parent or legal guardian.

(5) The parent, legal guardian, or the school may revoke the authorization at any time by notifying the other parties to the authorization and the department.

[Statutory Authority: Chapters 43.22 and 49.12 RCW, RCW 26.28.060 and 43.17.060. 93-01-068, § 296-125-026, filed 12/11/92, effective 3/1/93.]

WAC 296-125-027 Hours of work for minors. Employers shall restrict the hours of minors' employment as follows:

(1) During the school year:

(a) Minors may work the following total of hours:

(i) Minors under the age of sixteen:

(A) Maximum of three hours per day on any school day preceding another school day or otherwise a maximum of eight hours per day;

(B) Maximum of six days per week; and

(C) Maximum of sixteen hours per week;

(D) Except that no minors of this age shall work in house-to-house sales without a variance issued by the department pursuant to WAC 296-125-060(7).

(ii) Sixteen- and seventeen-year-old minors:

(A) Maximum of four hours per day on any school day preceding another school day or otherwise a maximum of eight hours per day;

(B) Maximum of six days per week; and

(C) Maximum of twenty hours per week.

(b) Minors shall work during the following hours only:

(i) Minors under the age of sixteen:

(A) No earlier than 7:00 a.m.;

(B) No later than 7:00 p.m. on any day preceding a school day;

(C) No later than 9:00 p.m. on Fridays, Saturdays, and the day preceding a school holiday or vacation, provided that minors employed past 8:00 p.m. in service occupations shall be supervised by a responsible adult employee who is on the premises at all times; and

(D) Not during school hours;

(E) Except that minors of this age shall not be employed in house-to-house sales without a variance issued by the department pursuant to WAC 296-125-060(7).

(ii) Sixteen- and seventeen-year-old minors:

(A) No earlier than 7:00 a.m.;

(B) No later than 10:00 p.m. on any day preceding a school day;

(C) No later than 12:00 a.m. on Fridays, Saturdays, and the day preceding a school holiday or vacation, provided that minors employed past 8:00 p.m. in service occupations shall be supervised by a responsible adult employee who is on the premises at all times; and

(D) Not during school hours, unless the minor has been excused from school attendance by the minor's school district superintendent or her or his authorized agent.

(2) During school vacations:

(a) Minors may work the following total of hours:

(i) Minors under the age of sixteen:

(A) Maximum of eight hours per day;

(B) Maximum of six days per week; and

(C) Maximum of forty hours per week;

(D) Except that no minors of this age shall work in house-to-house sales without a variance issued by the department pursuant to WAC 296-125-060(7).

(ii) Sixteen- and seventeen-year-old minors:

(A) Maximum of eight hours per day;

(B) Maximum of six days per week; and

(C) Maximum of forty-eight hours per week.

(b) Minors shall work during the following hours only:

(i) Minors under the age of sixteen:

(A) No earlier than 7:00 a.m.; and

(B) No later than 9:00 p.m. provided that minors employed past 8:00 p.m. in service occupations shall be supervised by a responsible adult employee who is on the premises at all times.

(ii) Sixteen- and seventeen-year-old minors:

(A) No earlier than 5:00 a.m.; and

(B) No later than 12:00 a.m. provided that minors employed past 8:00 p.m. in service occupations shall be supervised by a responsible adult employee who is on the premises at all times, and except no later than 9:00 p.m. for minors employed in house-to-house sales.

(3) Sixteen- and seventeen-year-old minors who have been issued a certificate of educational competence pursuant to RCW 28A.305.190, are enrolled in a bona fide college program, are named on a valid certificate of marriage, or are shown as the parent on a valid certificate of birth may work as would be permitted during school vacations.

[Statutory Authority: Chapters 43.22 and 49.12 RCW, RCW 26.28.060 and 43.17.060 and chapters 49.12 and 43.22 RCW and RCW 43.17.060, 93-01-068 and 93-01-116, § 296-125-027, filed 12/11/92 and 12/21/92, effective 7/1/93; Order 76-15, § 296-125-027, filed 5/17/76.]

WAC 296-125-028 Meal and rest breaks for minors. (1) Minor employees shall not work more than four hours without being provided a meal period of at least thirty minutes. The meal period shall be separate and distinct from, and in addition to, rest breaks mandated by this section.

(2) Minor employees shall be provided a rest break of at least ten minutes, on the employer's time, for each four hours of working time.

(3) If a minor employee works for a four-hour period, that employee shall not be required to work more than two hours without either a ten-minute rest break or a thirty-minute meal period.

(4) Meal periods and rest breaks shall be provided in a manner so as to provide rest from work, and, therefore, shall not be scheduled near the beginning of a minor employee's work shift.

[Statutory Authority: Chapters 43.22 and 49.12 RCW, RCW 26.28.060 and 43.17.060, 93-01-068, § 296-125-028, filed 12/11/92, effective 3/1/93.]

WAC 296-125-030 Prohibited and hazardous employment—All minors. The following employments and occupations as outlined in subsections (1) through (30) of this section, are prohibited for all minors, provided that exemption will be allowed from subsections (5), (8), (9), (11), (13), (15), (16), and (23) of this section when the minor is participating in a bona fide cooperative vocational education program, diversified career experience program, or work experience program certified and monitored by the office of the superintendent of public instruction or the minor employee's school district; further, exemption from the same numbered prohibitions will be allowed for any minor involved in an apprenticeship program registered with the Washington state apprenticeship and training council. The state will not grant variances for employments or occupations prohibited by the United States Department of Labor.

(1) Occupations in or about plants or establishments manufacturing or storing explosives or articles containing explosive components.

(2) Occupations involving regular driving of motor vehicles. Occupations of outside helper or flagger on any public road or highway, work which involves directing moving motor vehicles in or around warehouses or load-

ing/unloading areas including but not limited to loading docks, transfer stations, or landfills, or work which involves towing vehicles. Occasional driving is permissible if: The minor has a valid state driver's license for the type of driving involved; driving is restricted to daylight hours; such driving is only occasional, and is incidental to the minor's employment; vehicle gross weight is under 6,000 pounds; the minor has completed a state-approved driver education course; and seat belts are provided in the vehicle and the minor has been instructed to use them. Occupations involving occasional operation of a bus are prohibited.

(3) All mining occupations.

(4) Logging occupations and occupations in the operation of any sawmill, lath mill, shingle mill, or cooperage-stock mill.

(5) Occupations involving operation or repair, oiling, cleaning, adjusting, or setting up of any power-driven wood-working machines.

(6) Occupations involving potential exposure to radioactive substances and to ionizing radiation.

(7) Occupations involving operation or repair, oiling, cleaning, adjusting, or setting up of elevators. This includes riding on a manlift.

(8) Occupations involving operation or repair, oiling, cleaning, adjusting, or setting up of power-driven metal-forming, punching, and shearing machines.

(9) Occupations involving slaughtering, meat packing, processing, or rendering.

(10) Occupations involving operation or repair, oiling, cleaning, adjusting, or setting up of power-driven bakery machines.

(11) Occupations involving operation or repair, oiling, cleaning, adjusting, or setting up of power-driven paper-products machines.

(12) Occupations involving manufacturing of brick, tile, and kindred products.

(13) Occupations involving operation or repair, oiling, cleaning, adjusting, or setting up of power-driven circular saws, band saws, and guillotine shears.

(14) Occupations involving wrecking, demolition, and shipbreaking operations.

(15) All roofing operations.

(16) Occupations involving excavations.

(17) Occupations involving operation or repair, oiling, cleaning, adjusting, or setting up of or working in proximity to earth-moving machines, hoisting apparatus, cranes, garbage-compactors, trash-compactors or other compactors, paper-balers or other balers, or other heavy equipment including, but not limited to, graders, bulldozers, earth compactors, backhoes, and tractors. Working in proximity shall mean working within the radius of movement of any portion of the machinery where one could be struck or otherwise injured. It shall not include work in proximity to ski-lift apparatus. This prohibition shall not invalidate activities allowed under subsection (2) of this section.

(18) Work in establishments or workplaces being picketed during the course of a labor dispute.

(19) Work as a nurse's aide/assistant; unless the minor is a student in a bona fide state-certified nursing training program or has successfully completed such a program.

(20) Work as a maid or bellhop in motels or hotels, unless the minor is accompanied by a responsible adult

whenever the work requires the minor to enter an assigned guest room, whether or not it is occupied at the time the minor is in the room. Minors may work in unassigned, unoccupied guest rooms unaccompanied by an adult.

(21) Work in sauna or massage parlors, body painting or tattoo studios, or adult entertainment establishments.

(22) Occupations requiring the wearing of personal protective equipment or wearing apparel as defined and required by statutes or rules and regulations administered by the department's division of industrial safety and health as related to hazardous substances exposure and/or hazardous noise exposure per chapters 296-24 and 296-62 WAC; except those occupations where the only requirement is the wearing of gloves, boots, or eye protection if the occupation is not otherwise prohibited by this section or by WAC 296-125-033. This subsection's prohibitions shall not apply if a minor is a student in a bona fide health care career training or vocational education program.

(23) Occupations involving fire fighting and fire suppression duties.

(24) Occupations where there is a risk of exposure to bodily fluids or transmission of infectious agents, including but not limited to hepatitis and HIV, in accordance with standards established by WAC 296-62-08001 (Occupational exposure to blood-borne pathogens), including lab work which entails the cleaning of medical equipment used to draw or store blood or other contaminated tissue; duties which involve venipuncture; and duties involving work with laundry from health care facilities; unless the minor is a student in a bona fide health care career training or vocational education program. State-certified life guards with first aid training are exempt.

(25) Occupations involving potential exposure to hazardous substances which are considered to be carcinogenic, corrosive, highly toxic, toxic sensitizers, or which have been determined to cause reproductive health effects or irreversible end organ damage. This does not include handling of such substances in sealed containers in retail situations. This subsection's prohibitions shall not apply to any consumer product or hazardous substance, as those terms are defined by the Consumer Product Safety Act (15 U.S.C. 2051 et seq.) and the Federal Hazardous Substances Act (15 U.S.C. 1261 et seq.) and those statutes' regulations, where the employer of a minor can demonstrate that a product or substance is used in the workplace in the same manner as normal consumer use, and which use results in a duration and frequency of exposure that is not greater than exposures experienced by consumers using the product or substance in conformity with the manufacturer's instructions, provided that such exposures are not otherwise prohibited by subsection (22) of this section.

(26) In selling to passing motorists on the public right of way candy, flowers, or other merchandise or commodities. Selling to motorists from a window counter is not prohibited.

(27) Work performed in or about boiler or engine rooms.

(28) All work performed more than ten feet above ground or floor level.

(29) Work in freezers, meat coolers, and all work in preparing meats for sale (wrapping, sealing, labeling, weighing, pricing, and stocking are permitted if work is performed away from meat-cutting and preparation areas).

Occasional entry into freezers or coolers for obtaining stock or placing stock shall not be prohibited.

(30) Service occupations if a minor works past 8:00 p.m., unless the minor is supervised by a responsible adult employee who is on the premises at all times.

[Statutory Authority: Chapters 43.22 and 49.12 RCW, RCW 26.28.060 and 43.17.060. 93-01-068, § 296-125-030, filed 12/11/92, effective 3/1/93. Statutory Authority: RCW 43.22.270 and 1989 c 216. 89-23-003, § 296-125-030, filed 11/3/89, effective 11/20/89; Order 77-32, § 296-125-030, filed 12/30/77; Order 76-15, § 296-125-030, filed 5/17/76; Order 74-9, § 296-125-030, filed 3/13/74, effective 4/15/74; Order 71-5, § 296-125-030, filed 5/26/71, effective 7/1/71; Section E, filed 9/18/63; Rules (part), filed 3/23/60.]

WAC 296-125-033 Prohibited and hazardous employment—Special restrictions for minors under the age of 16. Employment of minors under age 16 is subject to the following additional restrictions. They are prohibited from working:

(1) In any manufacturing operations.

(2) In any processing operations (including but not limited to filleting of fish, dressing poultry, cracking nuts, commercial processing, canning, freezing or drying of foods, laundering as performed by commercial laundries and dry cleaning).

(3) In any public messenger service, including but not limited to work that is performed by foot, bicycle, or public transportation.

(4) In occupations connected with transportation, warehouse and storage, communications and public utilities, or construction. (Office work related to these occupations is permitted if none of the minor's work is performed on the transportation media or construction site.)

(5) In the following specific areas of retail, food service or gasoline service station operations:

(a) Maintenance or repair work.

(b) Window washing or other work requiring worker to be positioned at higher than ground or floor level.

(c) Cooking and baking.

(d) Operating, setting up, adjusting, cleaning, oiling or repairing power-driven food slicers and grinders, food choppers and cutters and bakery-type mixers.

(6) In occupations involving work in the operation of amusement parks, street carnivals, and traveling shows.

(7) Loading and unloading goods to or from trucks, railroad cars, or conveyors.

(8) In occupations involving operation or repair, oiling, cleaning, adjusting, or setting up of or working in proximity to any power-driven machinery.

[Statutory Authority: Chapters 43.22 and 49.12 RCW, RCW 26.28.060 and 43.17.060. 93-01-068, § 296-125-033, filed 12/11/92, effective 3/1/93; Order 76-15, § 296-125-033, filed 5/17/76.]

WAC 296-125-043 Minimum wages—Minors. Except where a higher minimum wage is required by Washington state or federal law:

(1) Every employer shall pay to each of his or her employees who have reached their sixteenth or seventeenth year of age a rate of pay per hour which is equal to the hourly rate required by RCW 49.46.020 for employees eighteen years of age or older, whether computed on an

hourly, commission, piecework, or other basis, except as may be otherwise provided under this chapter.

(2) Every employer shall pay to each of his or her employees who have not reached their sixteenth year of age a rate of pay per hour that is not less than eighty-five percent of the hourly rate required by RCW 49.46.020 for employees eighteen years of age or older whether computed on an hourly, commission, piecework, or other basis, except as may be otherwise provided under this chapter.

(3) These provisions shall not apply to handicapped minors for whom special handicapped minor work permits have been issued as provided in RCW 49.12.110. The handicapped rate therein shall be set at a rate designed to adequately reflect the individual's earning capacity.

(4) These minimum wage provisions shall not apply when a minor student is in a work place to carry out an occupational training experience assignment directly supervised on the premises by a school official or an employer under contract with a school and when no appreciable benefit is rendered to the employer by the presence of the minor student.

[Statutory Authority: RCW 43.22.270 and 1988 c 236. 89-10-014 (Order 88-32), § 296-125-043, filed 4/24/89, effective 6/1/89; Order 76-15, § 296-125-043, filed 5/17/76.]

WAC 296-125-050 Posting, recordkeeping, and authority to enter, inspect, and investigate. (1) Posting. Each employer, as defined in WAC 296-125-015, shall post a copy of a valid minor work permit, issued pursuant to WAC 296-125-020, along with a current copy of the poster required by WAC 296-126-080 in plain view of all employees at each workplace specified in the permit. In the case of employers of minors employed in house-to-house sales, the permit and poster shall be posted, along with the employer's house-to-house sales registration certificate, issued pursuant to WAC 296-125-024, in plain view of all employees at the employer's primary place of business within the state of Washington.

(2) Recordkeeping. The employer shall be responsible for obtaining and maintaining on file for three years from the last date of employment the following information concerning each minor employee:

(a) Proof of age by means of a copy of one of the following: Birth certificate, together with a copy of the minor's Social Security card; driver's license; baptismal record, together with the minor's Social Security card; or notarized statement of parent or legal guardian.

(b) Personal data relating to the minor, including name, address, and, if available, telephone number.

(c) Description of employment: Earliest and latest hours of employment; descriptions of specific meal and rest periods; and complete description of duties.

(d) Parental authorization for employment by signature of parent or legal guardian on the parent/school authorization form, pursuant to WAC 296-125-026. If a minor employee is to be or has been transported out of the state for house-to-house sales, the parental authorization must include express written authorization for the minor to be transported out of the state for this purpose.

(e) School authorization for employment during any part of the school year, pursuant to WAC 296-125-026.

(f) Any variances obtained by the employer pursuant to WAC 296-125-060 or 296-125-070.

(3) Authority to enter, inspect, investigate, and interview. In order to carry out the purposes of this chapter, the director or the director's authorized representative is authorized:

(a) To enter without delay any workplace where work is or has been performed by a minor, or where employment records are, or are required to be, maintained; and

(b) To inspect, transcribe, and copy all pertinent records, and to inspect and investigate any workplace and all pertinent conditions, structures, machines, apparatus, devices, equipment, supplies, and materials therein, and to question privately any employer, owner, operator, agent, or employee.

[Statutory Authority: Chapters 43.22 and 49.12 RCW, RCW 26.28.060 and 43.17.060. 93-01-068, § 296-125-050, filed 12/11/92, effective 3/1/93; Order 76-15, § 296-125-050, filed 5/17/76; Order 71-5, § 296-125-050, filed 5/26/71, effective 7/1/71; Section I, filed 9/18/63; Rules (part), filed 3/23/60.]

WAC 296-125-060 Variances. (1) Upon written application from an employer, a variance from any standard herein may be granted by the director of the department or her or his designee if an employer demonstrates that there is good cause for the issuance of such a variance. The employer shall give notice of the employer's variance request to the employees at the workplace for which a variance is sought or, if a collective bargaining agreement exists, to the employees' representative, in order that the employees may submit their written views to the director or her or his designee on any variance request. The employer shall notify employees within three calendar days of the submission of the variance request to the director or her or his designee. No variance from federal regulations will be issued except where the employer can show exemption from federal statutes and regulations governing minor work. Variances will be granted, as applicable, based on good cause shown, for residential schools, apprenticeship programs registered with the Washington state apprenticeship and training council, vocational education, diversified career education, work experience, and cooperative education programs accepted and certified by the office of superintendent of public instruction or the local school district.

(2) The director or her or his designee may request or receive additional information from the applicant or other interested parties related to variance requests.

(3) Variances shall be issued only to employers with valid minor work permits and each variance shall expire upon the expiration of the employer's minor work permit that was in effect at the time of issuance of the variance unless the variance has been issued with an earlier expiration date. Upon renewal of a minor work permit, the employer must apply for a new variance.

(4) "Good cause" shall mean, at a minimum, those situations in which the employer demonstrates to the department that the employer's circumstance warrants an alternative procedure, and where the employer is able to demonstrate to the department that such alternative would not have a harmful effect on the health, safety, and welfare, including the variance's impact on school attendance and performance, of the minor employee(s) affected. Consideration may also be given by the department to the financial

need of the minor's family or exceptional or special talents manifested by the minor.

(5) **Revocation, suspension, and modification.** The department may revoke, suspend, or modify an employer's variance if the department finds that a condition of the variance's issuance has not been satisfied, that the employer has violated the requirements of this chapter, or that any other condition exists which is or could be detrimental to the health, safety, or welfare of a minor including the variance's impact on a minor's school attendance or performance.

(6) **Appeals.** An appeal of an action by the department to refuse to issue or renew, or to revoke, suspend, or modify a variance must be filed in writing with the department within thirty days of the department's action, pursuant to the procedures established by RCW 49.12.161 and 49.12.400. Such appeal shall not stay the effectiveness of an order of immediate restraint issued by the department pursuant to RCW 49.12.390.

(7) **House-to-house sales.** An employer seeking a variance to employ minors under the age of sixteen in house-to-house sales must demonstrate good cause for the issuance of such a variance and shall file a sworn statement, signed under the penalties of perjury, that the employer will ensure that the following minimum criteria will be satisfied at all times:

(a) All house-to-house sales visits will be conducted exclusively during daylight hours;

(b) A responsible adult who is at least twenty-one years of age will be in the minor's presence at all times;

(c) No house-to-house sales visits will be conducted in inclement weather; and

(d) The minor will be employed only for a specific, time-limited period, not to exceed six weeks.

[Statutory Authority: Chapters 43.22 and 49.12 RCW, RCW 26.28.060 and 43.17.060. 93-01-068, § 296-125-060, filed 12/11/92, effective 3/1/93; Order 76-15, § 296-125-060, filed 5/17/76.]

WAC 296-125-070 Special variances. (1) A special variance, to facilitate flexibility in a minor's school and work requirements, shall be available upon a showing of good cause. Good cause for a special variance may be demonstrated for sixteen- and seventeen-year-old minors not working in house-to-house sales, according to the terms and procedures set out in this section. A special variance may be obtained only for exceptions to the standards governing:

(a) Maximum hours of work per week during a week when school is in session, up to a maximum of twenty-eight hours per week; and

(b) Maximum hours of work per day during a week when school is in session, up to a maximum of six hours per day.

(2) The conditions precedent to a finding of good cause for a special variance shall include the following:

(a) The employer of the minor shall hold a valid minor work permit; and

(b) The minor's school district or individual private school shall be designated to participate in the special variance procedure by the department, pursuant to the requirements of subsection (3) of this section.

(3)(a) Each school district or individual private school seeking designation by the department to participate in the

special variance process shall enroll with the department, using a form provided by the department. Further, the district or individual private school shall agree to maintain a mandatory recordkeeping system specified by the department, and to use uniform criteria as described in subsection (7) of this section to evaluate variance requests. The enrollment form shall require, but not be limited to, the following information:

(i) Agreement to maintain the mandatory recordkeeping system;

(ii) Designation of a school official(s) at each school authorized to evaluate and approve or disapprove variance requests;

(iii) Agreement to use the uniform criteria in evaluating variance requests, including agreement to mandatory periodic review and reapproval of all special variances in effect as described in subsection (4) of this section;

(iv) Agreement to forward a copy of each variance form approved or denied by a school to the department within thirty days of the school's action; and

(v) Agreement to provide immediate access to all variance files during normal school office hours to agents of the department.

(b) Each participating school shall be responsible for ensuring that all sections on the variance form required to be filled out by the employer and the school are complete. Incomplete variances shall be deemed invalid and shall be cause for revocation of designation for participation of the school district or individual private school and of the employer in the special variance program, and shall be a violation of this chapter.

Upon evidence of incomplete variances, the department shall notify the school district or private school, in writing, of the revocation of enrollment in the special variance program.

The school district or private school may appeal the revocation, in writing, within thirty days of receipt of notice from the department. The written appeal shall be sent to the department pursuant to the procedures established by RCW 49.12.161 and 49.12.400. Such appeal shall not stay the effectiveness of an order of immediate restraint issued by the department pursuant to RCW 49.12.390.

(4) The special variance form to be valid shall be completed and signed by the employer, the minor, the minor's authorized school official pursuant to subsection (3) of this section, and the minor's parent or legal guardian. The minor's authorized school official and parent or legal guardian must reauthorize the special variance form, in writing, within forty-five days of the end of each regular grading period at the minor's school.

(5)(a) The department shall provide a form for the employer to complete that shall include, but need not be limited to, the following information to be provided by the employer to the minor, the authorized school official, and the minor's parent or legal guardian:

(i) The minor employee's work-related duties;

(ii) Maximum hours to be worked each week;

(iii) Length of work shifts;

(iv) Latest afternoon or evening hour to be worked by the minor employee;

(v) The number of days per week the minor employee will be required to work the latest afternoon or evening hour;

(vi) The employer's Unified Business Identifier (UBI) number; and

(vii) The date of expiration of the employer's minor work permit.

(b) The employer shall maintain all records of special variances according to the terms of WAC 296-125-050.

(c) No minor shall be permitted or suffered to work in excess of the maximum hours per week or per day during a week when school is in session, as prescribed by WAC 296-125-027 unless the minor's employer has a current, fully completed and executed variance for the minor on file at the minor's workplace.

(d) Any change in conditions described by (a)(i) through (v) of this subsection, except a return to the hours of work limitations prescribed by WAC 296-125-027, shall require initiation and completion of a new special variance.

(6) The minor shall complete her or his section of the variance form after the employer has completed its section and before the form is submitted to the school, parent, or legal guardian. The minor shall provide her or his reasons for the special variance request.

(7)(a) Approval or disapproval by the school shall be premised on the employer holding a current valid minor work permit, and on an assessment of the information required to be provided by the employer including the following factors:

(i) Student attendance patterns;

(ii) Student academic progress;

(iii) Opportunities for the minor to participate in extracurricular activities;

(iv) Number of school nights worked;

(v) Lateness of evening hours worked;

(vi) Length of work shift; and

(vii) Student's rationale for requesting hours of work exceeding the standards in WAC 296-125-027.

(b) The special variance form shall require the school official to provide data to the department that shall include, but not be limited to, the following:

(i) Age of the minor;

(ii) Cumulative grade point average and attendance record of the minor prior to starting work; and

(iii) Grade point average and attendance record of the minor for each grading period immediately preceding the school's current approval or disapproval.

(c) A copy of each variance form approved or denied by a school shall be forwarded to the department within thirty days of the school's action.

(8) The parent or guardian shall by her or his signature approve or deny the variance and signify review of the minor's statement of rationale.

(9) Expiration. Special variances shall be issued only to employers with valid minor work permits and each special variance shall expire upon the expiration date of the employer's minor work permit that was in effect at the time of the issuance of the special variance. Upon renewal of a minor work permit, the employer must complete a new special variance.

(10) Revocation and suspension. The department may revoke or suspend a special variance if the department finds that a condition of the variance's execution is not being or has not been satisfied, the employer has violated the requirements of this chapter, or any other condition exists which is

or could be detrimental to the health, safety, or welfare of a minor. Violation by the employer of the hours standards under WAC 296-125-027 or the hours specified in any special variance shall lead to loss of the right to participate in the special variance process for one year from a finding of violation by the department.

The parent, legal guardian, or the school may revoke the variance at any time by notifying the other parties to the variance and the department.

(11) Appeals. An appeal of an action by the department to refuse to issue or renew designation to participate in the special variance program, or to revoke or suspend a special variance or designation to participate in the special variance program must be filed in writing with the department within thirty days of the department's action, pursuant to the procedures established by RCW 49.12.161 and 49.12.400. Such appeal shall not stay the effectiveness of an order of immediate restraint issued by the department pursuant to RCW 49.12.390.

[Statutory Authority: Chapters 43.22 and 49.12 RCW, RCW 26.28.060 and 43.17.060. 93-01-068 and 93-04-112, § 296-125-070, filed 12/11/92 and 2/3/93, effective 3/1/93 and 7/1/93.]

Chapter 296-126 WAC

STANDARDS OF LABOR FOR THE PROTECTION OF THE SAFETY, HEALTH AND WELFARE OF EMPLOYEES FOR ALL OCCUPATIONS SUBJECT TO CHAPTER 49.12 RCW

WAC

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Reviser's note: For industrial welfare committee appeal procedures, see also chapter 296-129 WAC.

**DISPOSITION OF SECTIONS FORMERLY
CODIFIED IN THIS CHAPTER**

296-126-224 Wearing apparel. [Statutory Authority: RCW 49.12.091. 78-03-004 (Order 78-1), § 296-126-224, filed 2/3/78.] Repealed by 97-01-124, filed 12/19/96, effective 1/19/97. Statutory Authority: RCW 49.12.091 (as amended by RCW 43.22.282).

WAC 296-126-001 Applicability. These standards, adopted pursuant to the authority of chapter 49.12 RCW as amended by chapter 16, Laws of 1973 2nd ex. sess., shall apply to any person employed in any industry or occupation within the state of Washington, unless:

(1) Exempted by the provisions of chapter 49.12 RCW (newspaper vendors or carriers, domestic or casual labor in or about private residences, agricultural labor as defined in RCW 50.04.150, as now or hereafter amended, and sheltered workshops, are all exempt from these provisions);

(2) Otherwise exempted in rules and regulations adopted by the industrial welfare committee of the state of Washington;

(3) Exempted by a variance issued under the provisions in WAC 296-126-130;

(4) Such person is an employee of the state or any political subdivision, or municipal corporation to the extent that these rules conflict with any statute, rule or regulation adopted under the authority of the appropriate legislative body.

[Order 74-9, § 296-126-001, filed 3/13/74, effective 4/15/74.]

WAC 296-126-002 Definitions. (1) "Employer" means any person, firm, corporation, partnership, business trust, legal representative, or other business entity which engages in any business, industry, profession, or activity in this state and employs one or more employees, unless exempted by chapter 49.12 RCW or these rules.

(2) "Employee" means an employee who is employed in the business of his employer whether by way of manual labor or otherwise. This definition is not intended, for purposes of these regulations, to include: Any individual registered as a volunteer with a state or federal volunteer program or any person who performs any assigned or authorized duties for an educational, religious, governmental or nonprofit charitable corporation by choice and receives no payment other than reimbursement for actual expenses necessarily incurred in order to perform such volunteer services; any individual employed in a bona fide executive, administrative or professional capacity or in the capacity of commissioned outside salesperson; nor is it intended to include independent contractors where said individuals control the manner of doing the work and the means by which the result is to be accomplished.

(3) "Employ" means to engage, suffer or permit to work.

(4) "Adult" means any person of either sex, eighteen years of age or older.

(5) "Minor" means any person of either sex under eighteen years of age.

(6) "Student learner" means a person enrolled in a bona fide vocational training program accredited by a national or regional accrediting agency recognized by the United States Office of Education, or authorized and approved by the

Washington state commission for vocational education, who may be employed part time in a definitely organized plan of instruction.

(7) "Learner" means a worker whose total experience in an authorized learner occupation is less than the period of time allowed as a learning period for that occupation in a learner certificate issued by the director pursuant to regulations of the department of labor and industries.

(8) "Hours worked" shall be considered to mean all hours during which the employee is authorized or required by the employer to be on duty on the employer's premises or at a prescribed work place.

(9) "Conditions of labor" shall mean and include the conditions of rest and meal periods for employees including provisions for personal privacy, practices, methods and means by or through which labor or services are performed by employees and includes bona fide physical qualifications in employment, but shall not include conditions of labor otherwise governed by statutes and rules and regulations relating to industrial safety and health administered by the department.

(10) "Committee" shall mean the industrial welfare committee as provided by law. The committee's secretary is the supervisor of employment standards in care of the Department of Labor and Industries, General Administration Building, Olympia, Washington 98504.

[Order 76-15, § 296-126-002, filed 5/17/76; Order 74-9, § 296-126-002, filed 3/13/74, effective 4/15/74.]

WAC 296-126-010 Minimum wages—Adults. Except where a higher minimum wage is required by Washington state or federal law, (1) every employer shall pay to each of his or her adult employees wages at a rate of not less than one dollar and eighty cents per hour, and effective January 1, 1975, not less than two dollars per hour, whether computed on an hourly commission, piecework or other basis, except as may be otherwise provided by law or regulation.

(2) These provisions shall not apply to outside commissioned salespersons; or to trainees, learners, student learners, apprentices or handicapped persons for whom special certificates or special permits have been issued as set forth in RCW 49.12.110. These special rates shall be computed as follows: Learners — 85% of the applicable minimum wage; student-learner — 75% of the applicable minimum rate; handicapped — at a rate designed to reflect adequately the individual's earning capacity.

[Order 74-9, § 296-126-010, filed 3/13/74, effective 4/15/74.]

WAC 296-126-020 Minimum wages—Minors. Except where a higher minimum wage is required by Washington state or federal law:

(1) Every employer shall pay to each of his or her employees who have reached their sixteenth or seventeenth year of age a rate of pay per hour which is equal to the hourly rate required by RCW 49.46.020 for employees eighteen years of age or older, whether computed on an hourly, commission, piecework, or other basis, except as may be otherwise provided under this chapter.

(2) Every employer shall pay to each of his or her employees who have not reached their sixteenth year of age

a rate of pay per hour that is not less than eighty-five percent of the hourly rate required by RCW 49.46.020 for employees eighteen years of age or older whether computed on an hourly, commission, piecework, or other basis, except as may be otherwise provided under this chapter.

(3) These provisions shall not apply to handicapped minors for whom special handicapped minor work permits have been issued as provided in RCW 49.12.110. The handicapped rate therein shall be set at a rate designed to adequately reflect the individual's earning capacity.

[Statutory Authority: RCW 43.22.270 and 1988 c 236. 89-10-014 (Order 88-32), § 296-126-020, filed 4/24/89, effective 6/1/89; Order 74-9, § 296-126-020, filed 3/13/74, effective 4/15/74.]

WAC 296-126-021 Minimum wages—Commissions and piecework. Where employees are paid on a commission or piecework basis, wholly or partially, (1) the amount earned on such basis in each work-week period may be credited as a part of the total wage for that period; and

(2) The total wages paid for such period shall be computed on the hours worked in that period resulting in no less than the applicable minimum wage rate.

[Order 74-9, § 296-126-021, filed 3/13/74, effective 4/15/74.]

WAC 296-126-022 Gratuities. For the purposes of these regulations, gratuities received by employees shall not be considered a part of the minimum wage.

[Order 74-9, § 296-126-022, filed 3/13/74, effective 4/15/74.]

WAC 296-126-023 Payment interval. All wages due shall be paid at no longer than monthly intervals to each employee on established regular pay days. To facilitate bookkeeping, an employer may implement a regular payroll system in which wages from up to seven days before pay day may be withheld from the pay period covered and included in the next pay period.

[Statutory Authority: RCW 43.22.270, 49.12.020, 49.12.091, 49.12.050, 49.46.020 and 49.46.070. 89-22-016 (Order 89-16), § 296-126-023, filed 10/24/89, effective 11/24/89; Order 74-9, § 296-126-023, filed 3/13/74, effective 4/15/74.]

WAC 296-126-025 Deductions. Except as otherwise provided by law, no employer shall make any deduction from the wage of an employee:

(1) For any cash shortage, walkout (failure of customer to pay), breakage, or loss of equipment, unless it can be shown that the shortage, walkout, breakage or loss was caused by a dishonest or willful act of the employee.

(2) For acceptance of a bad check, unless it can be shown that the employee accepted such a check in violation of procedures previously made known to him or her by the employer.

(3) For any cash shortage from a cash register, drawer or portable depository provided for that purpose, unless the employee has sole access to the cash and has participated in the cash accounting at the beginning of his or her shift and again at the end of said shift. Where a portable cash depository is in use the employer shall provide for periodic withdrawals of cash receipts during the shift to prevent large accumulations of cash.

[Order 74-9, § 296-126-025, filed 3/13/74, effective 4/15/74.]

WAC 296-126-040 Statements furnished. Every employer shall furnish to each employee at the time of payment of wages an itemized statement showing the pay basis (i.e., hours or days worked), rate or rates of pay, gross wages and all deductions therefrom for that pay period.

[Order 74-9, § 296-126-040, filed 3/13/74, effective 4/15/74.]

WAC 296-126-050 Employment records. (1) Every employer shall keep for at least three years a record of the name, address, and occupation of each employee, dates of employment, rate or rates of pay, amount paid each pay period to each such employee and the hours worked.

(2) Every employer shall make the record described in subsection (1) available to the employee, upon request, at any reasonable time.

(3) Every employer shall, upon written request by the employee, furnish within ten working days of the request to each employee who is discharged a signed written statement, setting forth the reasons for such discharge and the effective date thereof.

[Statutory Authority: RCW 43.22.270, 49.12.020, 49.12.091, 49.12.050, 49.46.020 and 49.46.070. 89-22-016 (Order 89-16), § 296-126-050, filed 10/24/89, effective 11/24/89; Order 74-9, § 296-126-050, filed 3/13/74, effective 4/15/74.]

WAC 296-126-060 Minor work permits. No minor shall be employed in any occupation or industry unless the employer shall have on file during the period of employment an unexpired work permit issued pursuant to section 15, chapter 16, Laws of 1973 2nd ex. sess., and regulations implementing said section in chapter 296-125 WAC. Such permit will not be issued except upon presentation of such evidence of age as is required by the industrial welfare committee.

[Order 74-9, § 296-126-060, filed 3/13/74, effective 4/15/74.]

WAC 296-126-070 Prohibited action. No employer shall discharge or in any other way discriminate against or penalize any employee who seeks information or a hearing concerning variance requests by an employer or information concerning employment standards, or who has filed a complaint alleging a violation of any employment standard.

[Order 74-9, § 296-126-070, filed 3/13/74, effective 4/15/74.]

WAC 296-126-080 Posting of order. The employer shall keep posted a current copy of these regulations in a form provided by the department. The poster shall be positioned in a readily accessible location and within plain view in each work site where an employee or employees are employed.

[Order 74-9, § 296-126-080, filed 3/13/74, effective 4/15/74.]

WAC 296-126-090 Hours. Any employee who feels the number of hours or other matters relating to overtime employment are detrimental to the health, safety or welfare of the employee may request the department of labor and industries to make an investigation following which the department will issue findings and conclusions. Whenever

the circumstances are found to be detrimental to the health, safety or welfare of the employee, the industrial welfare committee may adopt additional or revised employment standards.

[Order 76-15, § 296-126-090, filed 5/17/76.]

WAC 296-126-092 Meal periods—Rest periods. (1) Employees shall be allowed a meal period of at least 30 minutes which commences no less than two hours nor more than five hours from the beginning of the shift. Meal periods shall be on the employer's time when the employee is required by the employer to remain on duty on the premises or at a prescribed work site in the interest of the employer.

(2) No employee shall be required to work more than five consecutive hours without a meal period.

(3) Employees working three or more hours longer than a normal work day shall be allowed at least one 30-minute meal period prior to or during the overtime period.

(4) Employees shall be allowed a rest period of not less than 10 minutes, on the employer's time, for each 4 hours of working time. Rest periods shall be scheduled as near as possible to the midpoint of the work period. No employee shall be required to work more than three hours without a rest period.

(5) Where the nature of the work allows employees to take intermittent rest periods equivalent to 10 minutes for each 4 hours worked, scheduled rest periods are not required.

[Order 76-15, § 296-126-092, filed 5/17/76.]

WAC 296-126-094 General duty—Working conditions. It shall be the responsibility of every employer to maintain conditions within the work place environment that will not endanger the health, safety or welfare of employees. All facilities, equipment, practices, methods, operations and procedures shall be reasonably adequate to protect employees' health, safety and welfare.

[Order 76-15, § 296-126-094, filed 5/17/76.]

WAC 296-126-096 Lifting. Where weights in excess of 20 pounds are to be lifted, carried, pushed or pulled as a normal part of an employee's responsibility:

(1) The lifting, carrying, pushing or pulling duties shall be made known to the prospective employee at the time of recruitment, initial employment or reassignment to a lifting job.

(2) Instruction shall be given such employees on proper lifting techniques in accordance with instructions provided or approved by the department of labor and industries.

(3) Assurance that adequate instructions in weight lifting techniques have been given as provided in (2) shall be furnished the committee or its authorized agent upon request.

[Order 76-15, § 296-126-096, filed 5/17/76.]

WAC 296-126-098 Wearing apparel. (1) The employer shall provide for adequate safekeeping of employees' clothing worn to and from the workplace, but not worn on duty.

(2) What is and what is not a uniform?

(a) Apparel that is required by the employer to be worn during the course of employment is a uniform if it has an employer-designated:

- (i) Logo;
- (ii) Style; or
- (iii) Color with no other color options allowed.

For purposes of this section, black and white are included among colors.

Examples of uniform apparel required by the employer include but are not limited to: A guard uniform, white jacket and pants worn by culinary, cleaning, or medical personnel, a hat with an employer's logo worn only at work, and a white blouse and/or black skirt.

(b) Apparel worn at work by an employee at the direction of the employer is not a uniform if:

(i) It is usually and customarily worn outside of employment and conforms to a general dress standard allowing choice of style and color; or

(ii) It is considered personal protective equipment and governed by industrial safety and health statutes, rules, and regulations administered by the department of labor and industries.

(c) An employer may prohibit the wearing of certain articles of apparel as part of a general dress code, provided the prohibition still allows the employee options in choice of apparel.

Examples of nonuniform apparel include but are not limited to: Articles that are part of a general dress code allowing two or more color and/or style options, a WISHA required safety helmet, and a light shirt and/or dark pants.

(3) Employer responsibility for costs to furnish and maintain uniforms:

(a) The employer must pay costs to furnish and maintain (including laundry and repair) the uniform when costs of obtaining and maintaining the uniform would reduce the employee's wage below the applicable minimum wage or overtime compensation required by the Washington Minimum Wage Act, chapter 49.46 RCW.

Calculation examples include but are not limited to:

(i) *An employee is paid only minimum wage: The employer must pay all uniform costs.*

(ii) *An employee is paid one dollar per hour over minimum wage, works a forty-hour work week, and earns forty dollars above the required minimum each week: If the employer purchases the uniform for forty-five dollars, the employer may deduct up to forty dollars from the employee's earnings without impacting the minimum wage. If the employee purchases the uniform, the employer must reimburse the employee five dollars, the impact on minimum wage.*

(b) Except as indicated in this section, uniform costs that impact the minimum wage or overtime compensation earned during a work week must be paid in full to the employee at the earliest regular pay day. Payment shall not be prorated over time and shall be based upon the total cost at date of purchase.

(c) Reimbursement to an employee for laundering costs incurred during a work week shall be determined by:

(i) The actual cost of laundering (e.g., charges of a uniform laundry or rental service); or

(ii) If the actual cost cannot be determined, a forty-hour per week employee shall be paid one hour at the Washington minimum wage, and an employee who works less than forty hours per week shall be paid one-fifth of the minimum hourly wage.

(iii) Laundering costs do not apply to "wash and wear" clothing that do not require professional cleaning.

(d) An employer shall not charge an employee:

(i) A deposit for the cost of the uniform; or

(ii) Rent for the cost of maintaining the uniform; or

(iii) "Wear and tear" on the uniform.

(e) *Exceptions to this section:*

(i) An employer may withhold the actual cost (or not reimburse the employee's actual cost) of a uniform from an employee's final paycheck if the employee has ceased employment and has not returned the uniform to the employer. This withholding may be made provided the employee agrees to this policy upon hiring and provided that the final payroll amount is not reduced below the applicable minimum wage or overtime compensation required by chapter 49.46 RCW.

(ii) An employer is not required to reimburse an employee for obtaining a uniform when the uniform is owned by the employee and is acceptable to the employer at the time of hire. Costs associated with additional new uniforms shall be paid by the employer when the costs would reduce the employee's wage or overtime compensation below the state minimum in a work week.

[Statutory Authority: RCW 49.12.091 (as amended by RCW 43.22.282), 97-01-124, § 296-126-098, filed 12/19/96, effective 1/19/97; Order 76-15, § 296-126-098, filed 5/17/76.]

WAC 296-126-130 Variance. (1) Upon written application from an employer, a variance from any standard herein may be granted by the industrial welfare committee for good cause shown as authorized by section 8, chapter 16, Laws of 1973 2nd ex. sess. The employer shall give notice to the employees or their representative so that they may submit their written views to the committee on any variance request.

(2) The committee may afford the applicant and any involved employee, or their representatives, the opportunity for oral presentation whenever circumstances of the particular application warrant such additional procedure.

(3) Temporary variance valid for not more than thirty calendar days may be issued by the committee for good cause where immediate action is necessary and warranted pending further review by the committee.

(4) "Good cause" shall mean, but not be limited to, those situations in which the employer finds that his circumstance warrants an alternative procedure and where he is able to demonstrate to the committee that such alternative would not have a harmful effect on the health, safety and welfare of the employees involved.

[Order 74-9, § 296-126-130, filed 3/13/74, effective 4/15/74.]

WAC 296-126-140 Appeal procedures. (1) Any person, firm, or corporation feeling aggrieved by any action taken or decision made by an officer or employee of the

department, in enforcement of this law (chapter 49.12 RCW) or these standards may appeal such action or decision by filing written notice within thirty days of such action or decision with the committee's secretary, in care of the Department of Labor and Industries, General Administration Building, Olympia, Washington 98504. A copy of said appeal shall be sent to all other parties to the proceeding by the appealing party. A certification as to the service of said notice upon all other parties shall be filed in the office of the committee's secretary. The notice of appeal shall suspend such action or decision pending the determination by the committee. Detailed regulations concerning appeal procedures are contained in chapter 296-129 WAC.

(2) The appealing person, firm or corporation may elect an informal appeal by filing a letter within thirty days of the action or decision by the officer or employee of the department, which letter shall set forth a simple, clear and concise statement of the matter appealed from and the reasons for the appeal. This will then be acted upon without the need of any further submitted briefs. The committee will permit any other party concerned with the appeal to submit similarly a short concise letter stating their respective position on the issues raised by the appeal. The committee reserves the right to dispose of these informal appeals without hearing argument. The committee may either determine the same on the merits, or call for further hearings in the matter consistent with the intent of these regulations and the applicable law wherever appropriate.

(3) The committee shall review the record, accept and consider written briefs, formal or informal, and may hear oral arguments where deemed appropriate. The committee decision shall be final and binding upon all parties subject to judicial review pursuant to chapter 34.04 RCW, the Administrative Procedure Act.

(4) The general practice and procedural rules for the committee in WAC 296-010-010, et seq., as now or hereafter amended, shall be applicable unless otherwise provided for by these rules, chapter 296-126 WAC, or by express ruling of the committee.

[Order 74-9, § 296-126-140, filed 3/13/74, effective 4/15/74.]

WAC 296-126-200 Applicability. WAC 296-126-200 through 296-126-226 shall apply to persons employed in counselor staff occupations in organized seasonal recreational camps as herein defined.

[Statutory Authority: RCW 49.12.091, 78-03-004 (Order 78-1), § 296-126-200, filed 2/3/78.]

WAC 296-126-202 Definitions. (1) "Department" shall mean the department of labor and industries.

(2) "Committee" shall mean the industrial welfare committee of the department of labor and industries.

(3) "Organized camps," as used herein, shall refer to established resident group camps, which are established and maintained for recreation, education, vacation, or religious purposes, for use by organized groups wherein the activities are conducted on a closely supervised basis, and where day-to-day living facilities, including food and lodging, are provided either free-of-charge or by payment of fee.

(4) "Employ" means to engage, suffer, or permit to work.

(5) "Employee" shall mean any person who is employed in a counselor staff occupation in an organized seasonal recreational camp as herein defined.

(6) "Employer" means any person, association, partnership, private or public corporation who employs or exercises control over wages, hours, or working conditions of one or more employees.

(7) "Minor" shall mean any person under eighteen years of age.

(8) "Counselor staff occupations" shall include all work involving duties primarily relating to guidance, instruction, supervision, and care of campers in organized camps, whether such work involves direct charge of, or responsibility for, such activities, or merely assistance to persons in charge; but shall not include preseason training courses. Counselor staff occupations include, but are not limited to: Head counselor, assistant head counselor, specialist counselor or instructor (such as swimming counselor, arts and crafts counselor, etc.), group or division leader, camp parent, teacher, supervising counselor, senior counselor, counselor, general counselor, bunk counselor, assistant counselor, junior counselor, counselor aide, and kitchen helpers working no more than 27 hours in a given work week.

(9) "Resident counselor staff" shall mean staff who receive lodging and meals from the employer.

(10) "Nonresident counselor staff" shall mean staff who do not receive lodging and meals from the employer.

(11) "Counselor I," "Counselor II," and "Counselor III," shall be defined for purposes of this standard as follows: "Counselor I" is one never before employed in any counselor staff occupations; "Counselor II" is one who has had at least one season's employment in a counselor staff occupation; "Counselor III" is one who has had at least three seasons of employment in a counselor staff occupation.

(12) "Season of employment" is defined as a period of not less than six weeks, nor more than 12 weeks in any one calendar year, except that counselors employed less than six weeks in any one season may accumulate their employment experience from year to year to meet the minimum requirements for counselor grade.

[Statutory Authority: RCW 49.12.091. 78-03-004 (Order 78-1), § 296-126-202, filed 2/3/78.]

WAC 296-126-204 Minimum wage. Except as otherwise provided by chapter 49.46 RCW:

(1) The minimum wage for kitchen helpers working in excess of 27 hours per week, camp cooks, and all employees other than counselor staff, shall be no less than \$2.00 per hour for employees 18 years of age or older, and no less than \$1.75 for employees under age 18.

(2) Minimum wage rates for counselor staff occupations shall be as follows:

MINIMUM WEEKLY RATE

	Nonresident Employee (6-day week)	Resident Employee (6-day week)
COUNSELOR III	\$66.00	\$51.00
COUNSELOR II	45.00	30.00
COUNSELOR I	36.00	21.00

(3) The minimum daily wage rate for resident or nonresident counselor staff shall be prorated from the six-day basis.

(4) Minimum wage provisions shall not apply to resident campers under the age of 18 who are engaged in an in-training program, which provides prepared instructions and supervision by qualified counselor staff, and which requires no more than 24 on-duty hours weekly. Such resident campers shall (a) carry no responsibility for other campers and no bunk responsibility, except as a defined part of the training program and (b) shall not enter such a program unless their parents or guardians sign an authorization, which includes an outline of the program and a description of the duties and responsibilities involved.

[Statutory Authority: RCW 49.12.091. 78-03-004 (Order 78-1), § 296-126-204, filed 2/3/78.]

WAC 296-126-206 Limitation on number of employees paid in Counselor I and Counselor II rates.

In any week, an employer may pay the Counselor I rate to no more than 30 percent of the total number of employees in counselor staff occupations. Furthermore, the total number of employees paid at the Counselor I and Counselor II rates may not exceed 80 percent of the total staff. In small camps (40 campers or under) where the above percentage limitations may be unworkable, the supervisor of employment standards shall have authority to make reasonable adjustments of these limitations upon a showing that the above limitations will work a hardship.

[Statutory Authority: RCW 49.12.091. 78-03-004 (Order 78-1), § 296-126-206, filed 2/3/78.]

WAC 296-126-208 Premium pay for resident counselor staff occupations.

At termination of employment, a resident counselor staff member shall be entitled to premium payment of an additional 25 percent of the staff member's weekly rate of pay for each week of employment, unless he or she received 24 hours per week off-duty, 12 hours of which must have been in sequence. The 24 hours off-duty time need not have been accumulated in any one week.

[Statutory Authority: RCW 49.12.091. 78-03-004 (Order 78-1), § 296-126-208, filed 2/3/78.]

WAC 296-126-210 Board, lodging, and other services.

The minimum wage rates of resident counselor staff shall be subject to no charge by an employer for lodging or meals furnished by the employer or for any other services furnished in connection with camp business within reason.

[Statutory Authority: RCW 49.12.091. 78-03-004 (Order 78-1), § 296-126-210, filed 2/3/78.]

WAC 296-126-212 Travel expenses.

The employer shall pay the fare or make transportation available for any counselor staff member who is required or permitted to supervise, or assist in supervising, campers in transit.

[Statutory Authority: RCW 49.12.091. 78-03-004 (Order 78-1), § 296-126-212, filed 2/3/78.]

WAC 296-126-214 Records. Records showing the names of employees, dates of employment, wages paid, and days worked by them shall be kept by every employer for a period of at least three years and available for inspection by the representatives of the industrial welfare committee of the department of labor and industries at all reasonable times.

[Statutory Authority: RCW 49.12.091. 78-03-004 (Order 78-1), § 296-126-214, filed 2/3/78.]

WAC 296-126-216 Agreements. All employees must enter into a written agreement with the camp administration setting forth the remuneration, room and board, special services provided, and the nature of the work assignment as counselors and leaders. Resident camper parental authorizations and employee agreements are to be kept on file for a three-year period.

[Statutory Authority: RCW 49.12.091. 78-03-004 (Order 78-1), § 296-126-216, filed 2/3/78.]

WAC 296-126-218 Work permits. No minor shall be employed until the employer has applied for and received a permit to employ minors from the department of labor and industries, and has obtained a parental authorization and proof of age document for each minor employee.

[Statutory Authority: RCW 49.12.091. 78-03-004 (Order 78-1), § 296-126-218, filed 2/3/78.]

WAC 296-126-220 Minors' occupations. No minor worker shall be employed in any occupation which the department of labor and industries, through the industrial welfare committee, shall declare to be particularly hazardous for minors under the age specified in the minor work permit regulation, chapter 296-125 WAC.

[Statutory Authority: RCW 49.12.091. 78-03-004 (Order 78-1), § 296-126-220, filed 2/3/78.]

WAC 296-126-222 Sanitation and safety. (1) All places of employment shall be maintained in a sanitary condition in conformity with the requirements for sanitation for camps set by the health services division, department of social and health services and/or the Washington Industrial Safety and Health Act (WISHA).

(2) All places of employment shall be maintained in a safe condition in conformity with the WISHA standards of the department of labor and industries, division of industrial safety and health.

(3) First aid requirements of the WISHA standards of the department of labor and industries shall be met. In addition, the provision of an infirmary with the full-time services of a physician and/or registered nurse is recommended for camps operated by one organized group for more than two weeks.

(4) Transportation shall be available at all times for use in case of an emergency and shall be of a nature to render reasonable comfort to an injured person.

(5) If preemployment physical examinations, including preventive inoculations, recommended by public health authorities are required of employees, such examinations shall not be at the expense of the employee.

(6) No employee shall be required or permitted to lift or carry excessive weights. Where weights in excess of 20 pounds are to be lifted, carried, pushed, or pulled as a normal part of an employee's responsibility:

(i) The lifting, carrying, pushing or pulling duties shall be made known to the prospective employee at the time of recruitment, initial employment or reassignment to a lifting job.

(ii) Instruction shall be given such employees on proper lifting techniques in accordance with instructions provided or approved by the department of labor and industries.

(iii) Assurance that adequate instruction in weight lifting techniques have been given as provided in (ii) shall be furnished the committee or its authorized agent upon request.

(7) Employee assignments to counseling duties shall be in keeping with the employee's maturity, knowledge, and skills. The health and welfare of the employee shall be considered in the determination of adequate counselor staff-camper ratios. Personnel should be selected on the basis of standards currently prescribed in the American Camping Association Resident Camp standards.

[Statutory Authority: RCW 49.12.091. 78-03-004 (Order 78-1), § 296-126-222, filed 2/3/78.]

WAC 296-126-226 Penalties. The department shall investigate the complaint of any individual alleging that these standards have been violated. Any employer employing any person in violation of these standards shall upon conviction thereof be punished in accordance with RCW 49.12.170, which states as follows: "Any employer employing any person for whom a minimum wage or standards, conditions, and hours of labor have been specified, at less than said minimum wage, or under standards, or conditions of labor or at hours of labor prohibited by the rules and regulations of the committee; or violating any other of the provisions of this 1973 amendatory act, shall be deemed guilty of a misdemeanor, and shall, upon conviction thereof, be punished by a fine of not less than twenty-five dollars nor more than one thousand dollars."

[Statutory Authority: RCW 49.12.091. 78-03-004 (Order 78-1), § 296-126-226, filed 2/3/78.]

**Chapter 296-127 WAC
PREVAILING WAGE**

WAC

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296-127-990	Severability.

DISPOSITION OF SECTIONS FORMERLY CODIFIED IN THIS CHAPTER

296-127-016	Coverage and exemptions of workers involved in the production and delivery of materials predominantly used in road construction. [Statutory Authority: Chapters 39.04 and 39.12 RCW and RCW 43.22.270. 88-22-046 (Order 88-22), § 296-127-016, filed 10/31/88.] Repealed by 92-01-104, filed 12/18/91, effective 1/31/92. Statutory Authority: Chapters 39.04 and 39.12 RCW and RCW 43.22.270.
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WAC 296-127-010 Definitions for chapter 296-127 WAC. (1) "Department" means the department of labor and industries.

(2) "Director" means the director of the department or his or her duly authorized deputy or representative.

(3) "Industrial statistician" means the industrial statistician of the department's employment standards, apprenticeship, and crime victims (ESAC) division.

(4) "Assistant director" means the assistant director of the employment standards, apprenticeship, and crime victims (ESAC) division or his or her duly authorized deputy or representative.

(5) "Contractor" means:

(a) The prime contractor, and each and every subcontractor, required to be registered under chapter 18.27 RCW and/or licensed under chapter 19.28 RCW, that performs any work on a public works project site, and/or is required to pay industrial insurance premiums as a construction company.

(b) Employers engaged in shipbuilding and ship repair, building service maintenance, and any fabricator or manufacturer that produces nonstandard items specifically for a public works project.

(c) Employers that contract with contractors or subcontractors for the purpose of the production and/or delivery of materials pursuant to the terms of WAC 296-127-018.

(6) The term municipality shall include every city, county, town, district, political subdivision, or other public agency thereof which is authorized by law to require the execution of public work, except drainage districts, diking districts, diking and drainage improvement districts, drainage improvement districts, diking improvement districts, consolidated diking and drainage improvement districts, consolidated drainage improvement districts, consolidated diking improvement districts, irrigation districts, or any such other districts as shall from time to time be authorized by law for the reclamation or development of waste or undeveloped lands.

(7)(a) The term "public work" shall include:

(i) All work, construction, alteration, enlargement, improvement, repair, and/or demolition that is executed by contract, purchase order, or any other legal agreement and that is executed at the cost of the state of Washington or of any municipality. The source of the funding shall not determine the applicability of the statute, and may include, but is not limited to, such sources as those payments made through contracts with insurance companies on behalf of the insured state or municipality;

(ii) All work, construction, alteration, enlargement, improvement, repair, and/or demolition which, by law, constitutes a lien or charge on any property of the state or of a municipality;

(iii) All work, construction, alteration, repair, or improvement, other than ordinary maintenance that the state or a municipality causes to be performed by a private party through a contract to rent, lease, or purchase at least fifty percent of the project by one or more state agencies or municipalities, pursuant to RCW 39.04.260;

(iv) Maintenance, except ordinary maintenance as defined by (b)(iii) of this subsection, when performed by contract. Maintenance is defined as keeping existing facilities in good usable, operational condition;

(v) Janitorial and building service maintenance as defined by WAC 296-127-023, when performed by contract, on public buildings and/or assets; and

(vi) The fabrication and/or manufacture of nonstandard items produced by contract specifically for a public works project as defined by (a)(i) through (v) of this subsection.

(b) The term "public work" shall not include:

(i) Work, construction, alteration, enlargement, improvement, repair, demolition, and/or maintenance for which no wage or salary compensation is paid, consistent with the requirements of RCW 35.21.278;

(ii) The construction, alteration, repair, or improvement of any municipal street railway system;

(iii) Ordinary maintenance which is defined as work not performed by contract and that is performed on a regularly scheduled basis (e.g., daily, weekly, monthly, seasonally, semiannually, but not less frequently than once per year), to service, check, or replace items that are not broken; or work not performed by contract that is not regularly scheduled but

is required to maintain the asset so that repair does not become necessary.

(8) "Contract" means a contract, purchase order, or any other legal agreement in writing for public work to be performed for a fixed or determinable amount, which is duly awarded after advertisement and competitive bid. A contract that is awarded from a small works roster, or under the emergency provisions of state law, need not be advertised.

(9) "Residential construction" means construction, alteration, repair, improvement, or maintenance of single family dwellings, duplexes, apartments, condominiums, and other residential structures not to exceed four stories in height, including basement, when used solely as permanent residences. It does not include the utilities construction (water and sewer lines), or work on streets, or work on other structures (e.g., for recreation and business.)

[Statutory Authority: RCW 39.12.070, 94-01-100, § 296-127-010, filed 12/16/93, effective 1/16/94. Statutory Authority: Chapters 39.04 and 39.12 RCW and RCW 43.22.270, 92-01-104, § 296-127-010, filed 12/18/91, effective 1/31/92; 88-22-046 (Order 88-22), § 296-127-010, filed 10/31/88. Statutory Authority: RCW 39.12.050, 39.12.065, 43.22.270 and 51.04.020, 86-03-063 (Order 85-28), § 296-127-010, filed 1/17/86. Statutory Authority: RCW 39.12.015, 39.12.060 and HB 795, 1982 1st ex.s. c 38, 82-18-041 (Order 82-28), § 296-127-010, filed 8/27/82.]

WAC 296-127-011 Time for determining prevailing wage. (1) Prevailing wage rates for all public work contracts will be determined by the industrial statistician and published on the first business day of February and the first business day of August of each year. These rates shall become effective thirty days after the date of publication. However, the industrial statistician may revise an established prevailing wage rate in response to an administrative or judicial finding overturning the established rate, or at any time necessary to correct an error, with such revision becoming effective thirty days after the date of publication. However, in the event of an emergency as determined by the director of the department, such revised rate shall take effect upon publication.

(2) The department shall establish deadlines for the submission of:

(a) Completed wage surveys, for inclusion of submitted data in the survey computations;

(b) Newly ratified collective bargaining agreements for inclusion in the semiannual prevailing wage publication;

(c) Notice of collectively bargained wage and benefit adjustments, and/or relevant contractual changes, for inclusion in the semiannual prevailing wage publication; and

(d) Notice of changes in apprenticeship standards and incremental wage rates for inclusion in the semiannual prevailing wage publication.

(3) The applicable prevailing wage rates for a given public works contract will be determined as follows:

(a) For all public works contracts, except janitorial or building service maintenance contracts, the applicable prevailing wage rates shall be the rates that are in effect on the date when bids by prime contractors are due for submission to contract awarding agencies. These rates shall remain in effect for the duration of the contract.

(b) If contracts are not awarded within six months of the date bids are due, the applicable prevailing wage rates shall be those that are in effect on the date the contract is award-

ed. These rates shall remain in effect for the duration of the contract.

(4) If a contract for public work is not awarded pursuant to bids, the applicable prevailing wage rates shall be those that are in effect on the date when the contract is executed. These rates shall remain in effect for the duration of the contract.

(5) A schedule of the applicable prevailing wage rates must be included by:

(a) Contract awarding agencies, in the bid specifications and contract documents for each contract.

(b) Contractors, in the bid and/or contract documents provided to subcontractors.

[Statutory Authority: Chapters 39.04 and 39.12 RCW and RCW 43.22.270, 92-01-104, § 296-127-011, filed 12/18/91, effective 1/31/92; 88-22-046 (Order 88-22), § 296-127-011, filed 10/31/88. Statutory Authority: RCW 39.12.015, 39.12.060 and HB 795, 1982 1st ex.s. c 38, 82-18-041 (Order 82-28), § 296-127-011, filed 8/27/82.]

WAC 296-127-013 Scope of work definitions. (1) In order to determine applicable prevailing wage rates, the industrial statistician will issue scope of work descriptions for each trade and occupation recognized as being involved in public work.

(2) The industrial statistician may issue scope of work descriptions, using authoritative sources available to the department, such as:

(a) Washington state apprenticeship and training council approved apprenticeship standards;

(b) Collective bargaining agreements;

(c) Dictionaries of occupational titles;

(d) Experts from organized labor, licensed contractors, and contractors' associations;

(e) Recognized labor and management industry practice.

(3) The applicable prevailing wage rates for workers employed on public works projects shall be determined by the scopes of work performed by those workers, and not by their specific job titles.

(4) Scope of work descriptions may be established or revised:

(a) On the first business day of February and the first business day of August each year along with the prevailing wage publication; or

(b) In response to an administrative or judicial finding, or at any time necessary to correct an error.

(5) All scope of work descriptions shall become effective thirty days after their establishment or revision.

(6) The applicable scope of work description for a public works contract is the scope of work description that is in effect on the date that the bids are due to be submitted to the contract awarding agency. If the contract is not awarded within six months of the bid due date, then the applicable scope of work description shall be that which is in effect on the date that the contract is awarded. The same scope of work description shall remain in effect for the duration of the contract.

(7) The department shall make scope of work descriptions available to all interested parties upon request.

(8) The department shall notify trade associations, labor organizations, and public agencies, reasonably known to be affected, prior to adopting new scope of work descriptions or changes or additions to existing scope of work descrip-

tions, and shall provide sixty days from the date of issuance for comment. In the event a dispute arises regarding a scope of work description following the award of a public works contract, the aggrieved party may request an arbitration hearing pursuant to the provisions of RCW 39.12.060, WAC 296-127-060, 296-127-061, and 296-127-062.

[Statutory Authority: Chapters 39.04 and 39.12 RCW and RCW 43.22.270. 92-01-104, § 296-127-013, filed 12/18/91, effective 1/31/92; 88-22-046 (Order 88-22), § 296-127-013, filed 10/31/88.]

WAC 296-127-014 Usual benefits. (1) Employers are not required to establish "usual benefit" programs. If an employer chooses not to provide such benefits, however, wages paid must be at the full prevailing wage rate as defined by RCW 39.12.010.

(2) To be deemed a "usual benefit," the following requirements must be satisfied:

(a) Employer payments for the usual benefit shall be made only in conformance with all applicable federal and state laws, including the requirements of the Employment Retirement Income Security Act of 1974, as amended, and of the Internal Revenue Service; and

(b) Employee payments toward the usual benefit, through self-contribution, payroll deduction, or otherwise, shall not constitute a credit to the employer for prevailing wage purposes.

(3) "Usual benefits" are limited to the following:

(a) Health and welfare payments. This is medical insurance, which may include dental, vision, and life insurance. Insurance programs providing protection against industrial accidents or occupational illnesses which are mandated by state or federal statutes, and all related mandatory forms of protection, shall not qualify as health and welfare insurance.

(b) Employer payments on behalf of a person employed for the purpose of providing retirement income.

(c) Vacation payments made either directly to the employees or into a vacation fund, provided these benefits are paid to the employees.

(d) Apprentice training fund. Payments made to training programs approved or recognized by the Washington state apprenticeship and training council.

(e) Paid holidays. Payments made to employees for specified holidays.

(4) Any fringe benefits required by other local, state, or federal laws do not qualify as "usual benefits."

[Statutory Authority: Chapters 39.04 and 39.12 RCW and RCW 43.22.270. 92-01-104, § 296-127-014, filed 12/18/91, effective 1/31/92; 88-22-046 (Order 88-22), § 296-127-014, filed 10/31/88.]

WAC 296-127-01410 Information concerning prevailing wage usual benefits. (1) Contractors and employers shall conform to all posting and employee notification requirements provided by applicable federal and state laws concerning usual benefits plans.

(2) Contractors and employers must have, and make available to the department upon request, copies of all documents concerning usual benefits, as identified in WAC 296-127-014, for which employer payments are made.

[Statutory Authority: Chapters 39.04 and 39.12 RCW and RCW 43.22.270. 92-01-104, § 296-127-01410, filed 12/18/91, effective 1/31/92.]

WAC 296-127-015 Applicability of prevailing wages for supervisors. Determinations as to whether individuals are workers, laborers, or mechanics are based on the scope of work actually performed by the individuals, rather than the title of their occupations.

(1) Where additional supervisory duties are required of workers, laborers, or mechanics by statute or regulation, the industrial statistician shall establish a rate of pay for a work classification to be called "journey level in charge." These rates shall be published in the semiannual prevailing wage publication.

(2) Supervisors (e.g., foremen, general foremen, superintendents, etc.) are entitled to receive at least the journey level prevailing rate of wage for performing manual or physical labor:

(a) For each hour spent in the performance of manual or physical labor if it is for more than twenty percent but less than fifty percent of their hours worked on a public works project during any given week.

(b) For all hours worked in any given week if they perform manual or physical labor for fifty percent or more of their hours worked on a public works project during such week.

(3) If supervisors subject to the journey level prevailing wage rate are paid a salary, the compensation (salary divided by number of hours worked) must be equal to or greater than the prevailing wage rate for the type of work performed.

[Statutory Authority: Chapters 39.04 and 39.12 RCW and RCW 43.22.270. 92-01-104, § 296-127-015, filed 12/18/91, effective 1/31/92; 88-22-046 (Order 88-22), § 296-127-015, filed 10/31/88.]

WAC 296-127-017 Notice of wage determinations. Current prevailing wage data will be furnished by the office of the industrial statistician upon request.

[Statutory Authority: Chapters 39.04 and 39.12 RCW and RCW 43.22.270. 92-01-104, § 296-127-017, filed 12/18/91, effective 1/31/92. Statutory Authority: RCW 39.12.015, 39.12.060 and HB 795, 1982 1st ex.s. c 38. 82-18-041 (Order 82-28), § 296-127-017, filed 8/27/82.]

WAC 296-127-018 Coverage and exemptions of workers involved in the production and delivery of gravel, concrete, asphalt, or similar materials. The materials covered under this section are sand, gravel, crushed rock, concrete mix, asphalt, or other similar materials.

(1) Workers are subject to the provisions of chapter 39.12 RCW when they are employed by a contractor as defined by WAC 296-127-010 (5)(c) and:

(a) They are engaged for a public works project in the production of the above-listed materials in a sand or gravel pit, rock quarry, concrete mixing plant, or other similar facility; or

(b) They are engaged in the transportation of the above-listed materials for use on a public works project, whether or not they perform any work on the project site.

(2) All workers, regardless of by whom employed, are subject to the provisions of chapter 39.12 RCW when:

(a) They deliver any of the above-listed materials to a public works project site and perform any spreading, leveling, rolling, or otherwise participate in any incorporation of the materials into the project; or

(b) They wait at or near a public works project site to participate in the incorporation of any of the above-listed materials into the project; or

(c) They remove any materials from a public works construction site pursuant to contract requirements or specifications (e.g., excavated materials, materials from demolished structures, cleanup materials, etc.); or

(d) They work in a materials production facility (e.g., batch plant, borrow pit, rock quarry, etc.,) which is established for a public works project for the specific, but not necessarily exclusive, purpose of supplying materials for the project.

(3) Workers are not subject to the provisions of chapter 39.12 RCW when:

(a) The employees' duties do not include spreading, leveling, rolling, or otherwise participating in the incorporation of the delivered materials into a public works project, and they are employed by an established materials supplier either in the production or delivery of sand, gravel, crushed rock, concrete mix, asphalt or other similar materials;

(b) They are employed by a common or contract carrier trucking company principally or exclusively engaged in the hauling or delivery of such products, and the employees' duties do not include spreading, leveling, rolling, or otherwise participating in the incorporation of the delivered materials into a public works project; or

(c) Their employer is engaged in the production and stockpiling of such materials for unspecified future use by the state of Washington or by municipalities as defined by RCW 39.04.010.

(4) The applicable prevailing wage rate shall be determined by the locality in which the work is performed. Workers subject to the provisions of chapter 39.12 RCW, as outlined in subsection (1) of this section, who produce such materials at an off-site facility shall be paid the applicable prevailing wage rates for the county in which the off-site facility is located. Workers subject to the provisions of chapter 39.12 RCW, as outlined in subsection (1) of this section, who deliver such materials to a public works project site shall be paid the applicable prevailing wage rates for the county in which the public works project is located.

[Statutory Authority: Chapters 39.04 and 39.12 RCW and RCW 43.22.270, 92-01-104 and 92-08-101, § 296-127-018, filed 12/18/91 and 4/1/92, effective 8/31/92.]

WAC 296-127-019 Survey methodology. (1) The industrial statistician shall establish prevailing wage rates by:

(a) Conducting wage and hour surveys for established trades and occupations;

(b) Adopting the wage and benefit adjustments established in collective bargaining agreements for those trades or occupations where the most recently established prevailing wage rates were derived from a collective bargaining agreement; and/or

(c) In instances when the procedures established in (a) and (b) of this subsection are not feasible, employing other methods deemed appropriate by the industrial statistician as set out in subsection (8) of this section.

(2) The department will determine the identity of employers to be surveyed for a specific trade or occupation by:

(a) Mailing trade and occupation questionnaires to all contractors whose registration under chapter 18.27 RCW or license under chapter 19.28 RCW is active;

(b) Mailing trade and occupation questionnaires to Washington state department of transportation prequalified contractors; and

(c) Compiling and maintaining lists of employers that are not required to be registered under chapter 18.27 RCW or licensed under chapter 19.28 RCW, but that employ workers in building service maintenance, in shipbuilding or ship repair, in the fabrication and/or manufacture of nonstandard items produced specifically for a public works project, and/or in the production and delivery of materials as defined in WAC 296-127-018. Trades and occupations utilized by the shipbuilding and ship repair industries shall not have their survey data combined with their construction counterparts, for the purpose of establishing prevailing wage rates for that industry.

(3)(a) Wage survey forms will be mailed to:

(i) Those contractors and employers whose businesses currently are active and were active during the established survey period, and whose response to the trade and occupation questionnaire indicates that they employ one or more of the trades or occupations being surveyed; and

(ii) Labor unions representing workers in the trades or occupations being surveyed.

(b) The department annually shall mail to state-wide trade associations and state-wide labor organizations a proposed schedule of trades intended to be surveyed during the upcoming fiscal year. In addition, the department shall notify those state-wide trade associations and labor organizations, reasonably known to be affected, of the mailing of wage surveys.

(4) Data reported on survey forms may be verified by the department, and will be used only when submitted on behalf of or by:

(a) Individual contractors identified by a contractor registration number that currently is valid, and was valid during the established survey period;

(b) Employers that are not required to be registered under chapter 18.27 RCW or licensed under chapter 19.28 RCW, that directly employ and supervise workers as employees in building service maintenance, in shipbuilding or ship repair, in the manufacture of nonstandard items specifically produced for a public works project, or in the production and delivery of materials, as defined in WAC 296-127-018;

(c) Labor unions submitting wage and hour data on behalf of contractors and/or employers who are signatory to those unions' collective bargaining agreements covering the trade or occupation being surveyed; or

(d) Interested parties providing wage and hour data by trade and occupation from certified payroll records and/or from hours reported by trade and occupation on affidavits of wages paid, according to guidelines established by the department.

(5) The department shall use affidavit forms that include a requirement that contractors report the actual number of hours worked by each trade and occupation utilized on the public works project for which the affidavit is filed.

(6) Valid data reported on wage surveys shall be calculated, as follows:

(a) If the majority of hours reported for a trade or occupation in the largest city in a county is paid at the same wage rate, then that rate shall be established as the prevailing wage rate.

(b) If the same wage rate is not reported to have been paid for the majority of hours reported in the largest city in a county for a trade or occupation, then the average wage rate shall be established as the prevailing wage rate, based on a weighted average of the hours, wages, and benefits reported in the largest city.

(c) If a statistically significant number of hours fails to be reported for the largest city in a county, then the average wage rate for the county is established as the prevailing wage, based on a weighted average.

(d) If there fails to be reported for an entire county, sufficient hours to validate the survey data, that county's hours shall be combined with those reported for other counties that are adjacent, until the established hours threshold for validation has been met.

(7) Survey data will not be accepted if the data report the hours and wages of those who are exempt from the prevailing wage requirements of chapter 39.12 RCW, as defined in WAC 296-127-026.

(8)(a) The industrial statistician may utilize alternative methods to establish prevailing wage rates consistent with the terms of (b) of this subsection. These methods include, but are not limited to:

(i) The use of wage and hour data from the department of employment security;

(ii) The use of wage and hour data from the industrial insurance division of the department of labor and industries;

(iii) The use of data from surveys performed by the United States Department of Labor, wage and hour division; or

(iv) The use of wage and hour data reported to the department on affidavits of wages paid.

(b) These alternative methods will not be used for trades or occupations for which surveys had been completed as of the effective date of this section unless a subsequent survey produces insufficient data. In addition, these alternative methods may be used under circumstances that include, but are not limited to, the following:

(i) To establish prevailing wage rates for a new trade or occupation where a survey is not immediately feasible;

(ii) In response to an administrative or judicial determination of invalid wage rate or scope of work description;

(iii) In response to changes or additions in licensing, safety, or other requirements of other state agencies, departments or divisions; or

(iv) To establish rates for industries and trades and occupations generally not surveyed, in order to meet the requirement of having established wage rates for publication in contract or bid specifications as required by RCW 39.12.030.

(9) Any party that submits false information under this section shall, after a determination to that effect has been issued by the director after a hearing pursuant to chapter 34.05 RCW, forfeit as a civil penalty the sum of five hundred dollars.

[Statutory Authority: Chapters 39.04 and 39.12 RCW and RCW 43.22.270. 92-01-104, § 296-127-019, filed 12/18/91, effective 1/31/92; 88-22-046 (Order 88-22), § 296-127-019, filed 10/31/88.]

WAC 296-127-020 Interpretation of phrases used in chapter 39.12 RCW. (1) The "acceptance date of the public works project" referred to in RCW 39.12.065 is the date that the contract awarding agency formally accepts the completed public works project pursuant to state law.

(2) RCW 39.12.050 and 39.12.065 refer to "inadvertent filing or reporting error." The department defines an error as "inadvertent" if it is made by a contractor, as defined by WAC 296-127-010(5), or employer that shows that the error was made notwithstanding the use of due care by the contractor or employer. The burden of proving that an error is inadvertent rests with the contractor or employer charged with the error.

(3) The definition of "locality" in RCW 39.12.010(2) contains the phrase "wherein the physical work is being performed." The department interprets this phrase to mean the actual work site. For example, if nonstandard items specifically produced for public works projects are prefabricated in a county other than the county wherein the public works project is to be completed, the wage for the off-site prefabrication shall be the applicable prevailing wage for the county in which the actual prefabrication takes place. Workers who deliver such nonstandard items, as well as materials pursuant to the terms of WAC 296-127-018, shall be paid the applicable prevailing wage for the county in which the public works project is located.

(4) In the implementation and enforcement of RCW 39.12.050 the terms "contractor" and "subcontractor" include an entity, however organized, with substantially identical corporate and/or operational structure to an entity that has been found to violate RCW 39.12.050. The factors used to determine substantial identity shall include an assessment of whether there is: Substantial continuity of the same business operation; use of the same machinery and/or equipment; similarity of jobs and types of working conditions; continuity of supervisors; and similarity of product or services.

[Statutory Authority: Chapters 39.04 and 39.12 RCW and RCW 43.22.270. 92-01-104, § 296-127-020, filed 12/18/91, effective 1/31/92. Statutory Authority: RCW 39.12.050, 39.12.065, 43.22.270 and 51.04.020. 86-03-063 (Order 85-28), § 296-127-020, filed 1/17/86. Statutory Authority: RCW 39.12.015, 39.12.060 and HB 795, 1982 1st ex.s. c 38. 82-18-041 (Order 82-28), § 296-127-020, filed 8/27/82.]

WAC 296-127-021 Apprentice worker. Any apprentice employed on public works projects for whom an apprentice agreement is registered and approved by the state apprenticeship council pursuant to chapter 49.04 RCW within 60 days of hiring may be considered an apprentice and paid the applicable prevailing hourly rate for an apprentice of that trade for all hours worked.

[Statutory Authority: RCW 39.12.015, 39.12.060 and House Bill 795, 1982 1st ex.s. c 38. 82-18-041 (Order 82-28), § 296-127-021, filed 8/27/82.]

WAC 296-127-022 Overtime according to RCW 49.28.065. (1) Work performed on public works contracts will not require the payment of overtime rates for the first two hours worked in excess of eight hours per day when the employer and employee voluntarily enter into an agreement wherein the employee will work up to ten hours per day in a four-day week to accomplish forty hours of work.

(2) Recognizing that there may be days when a full ten hours of work is not available, the remainder of the forty

hours may be made up on another work day or days within the same work week, except work performed on Saturdays, Sundays, and holidays is subject to the established prevailing overtime provisions for a given trade or occupation, as provided in chapter 39.12 RCW.

(3) For the purpose of this section an agreement must:

(a) Have been authorized by employees who bargained collectively with their employers through representatives of their own choosing; or

(b) Be obtained in writing, signed, and dated by both parties; and

(c) Be entered into individually with each employee; and

(d) Be entered into separately for each public works project, except that an employer, at its option, may obtain an annual authorization; and

(e) State the name of the public works project with specificity; and

(f) Be entered into voluntarily by the employer and employee.

(4) Each employer must retain copies of the individual employee authorization agreements required pursuant to subsection (3) of this section for three years from the date of acceptance of the public works project by the contract awarding agency. Absence of an authorization record for an employee shall be deemed per se evidence of lack of that employee's authorization. Such records are payroll records, subject to the requirements of WAC 296-127-320.

(5) It is prohibited to work more than ten hours in any calendar day on a public works project except in cases of extraordinary emergency, such as danger to life or property.

(6) Notwithstanding the above provisions, overtime rates must be paid for all hours worked in excess of forty hours per week.

(7) This section provides a minimum public works overtime standard, and does not supersede prevailing overtime wage rates established under the authority of chapter 39.12 RCW.

[Statutory Authority: Chapters 39.04 and 39.12 RCW and RCW 43.22.270. 92-01-104, § 296-127-022, filed 12/18/91, effective 1/31/92. Statutory Authority: RCW 43.22.270. 88-19-055 (Order 88-21), § 296-127-022, filed 9/15/88.]

WAC 296-127-023 Building service maintenance.

The "public building service maintenance contracts" referred to in RCW 39.12.020 shall mean janitorial service contracts and cover only work performed by janitors, waxers, sham-pooers, and window cleaners.

For all building service maintenance contracts, the prevailing wage rates which are in effect on the date when the bids are required to be submitted to the contract awarding public agency are the minimum prevailing wage rates which must be paid for the first year of such contracts and thereafter. However, any building service maintenance contract of more than one year duration, must include wage increase language recognizing the potential for future variance in applicable prevailing wage(s) and specifying that the wages which a contractor shall pay its employees must be altered annually to recognize and follow the most recently promulgated increases in prevailing wages each year after the first year of the contract period. The cost of the increases in the wages due employees shall be borne by the contract awarding agency.

(1997 Ed.)

[Statutory Authority: Chapters 39.04 and 39.12 RCW and RCW 43.22.270. 88-22-046 (Order 88-22), § 296-127-023, filed 10/31/88.]

WAC 296-127-025 Applicability of joint federal-state standards. (1) When a public works project is subject to the provisions of the Washington state public works law, chapter 39.12 RCW, and the Federal Davis-Bacon and related acts, the contractor and every subcontractor on that project must pay at least the Washington state prevailing wage rates, if they are higher than the federal prevailing wage rates for the project unless specifically preempted by federal law.

(2) When the federal prevailing wage rates are higher than the Washington state prevailing wage rates, the contractor shall pay the federal rate as required by federal law.

[Statutory Authority: Chapters 39.04 and 39.12 RCW and RCW 43.22.270. 92-01-104, § 296-127-025, filed 12/18/91, effective 1/31/92; 88-22-046 (Order 88-22), § 296-127-025, filed 10/31/88.]

WAC 296-127-026 Exemptions for sole owners and their spouses, partnerships, corporations, and employees of public agencies. The prevailing wage requirements of chapter 39.12 RCW do not apply to:

(1) Sole owners and their spouses.

(2) Any partner who owns at least thirty percent of a partnership.

(3) The president, vice-president and treasurer of a corporation if each one owns at least thirty percent of the corporation.

(4) Workers regularly employed on monthly or per diem salary by the state or any political subdivision created by its laws.

[Statutory Authority: Chapters 39.04 and 39.12 RCW and RCW 43.22.270. 88-22-046 (Order 88-22), § 296-127-026, filed 10/31/88.]

WAC 296-127-030 Irrigation district exemption.

Contracts awarded by irrigation districts for the reclamation or development of waste or undeveloped lands are not covered by the prevailing wage law, pursuant to RCW 39.04.010. Any work, construction alteration, repair or improvement that is not solely for the reclamation or development of waste or undeveloped land is covered by the prevailing wage laws and therefore subject to all the laws and regulations contained in and adopted pursuant to chapter 39.12 RCW.

[Statutory Authority: RCW 39.12.015, 39.12.060 and House Bill 795, 1982 1st ex.s. c 38. 82-18-041 (Order 82-28), § 296-127-030, filed 8/27/82.]

WAC 296-127-040 Statement of intent to pay prevailing wages. (1) All statements of intent to pay prevailing wages submitted to the industrial statistician of the department shall be accompanied by a fee of twenty-five dollars for each statement. Fees shall be made payable to the department of labor and industries.

(2) Any agency, division, or department of the state of Washington which through agreement with the department certifies statements of intent for its own contracts shall provide to the industrial statistician each month the number of statements of intent certified and quarterly shall send a fee of twenty dollars for each statement of intent to pay prevailing wages it has certified. This fee shall be sent to the

industrial statistician and be made payable to the department of labor and industries.

[Statutory Authority: RCW 39.12.070. 94-01-100, § 296-127-040, filed 12/16/93, effective 1/16/94. Statutory Authority: RCW 43.22.270. 90-24-053, § 296-127-040, filed 12/3/90, effective 1/3/91. Statutory Authority: Chapters 39.04 and 39.12 RCW and RCW 43.22.270. 88-22-046 (Order 88-22), § 296-127-040, filed 10/31/88. Statutory Authority: RCW 39.12.015, 39.12.060 and House Bill 795, 1982 1st ex.s. c 38. 82-18-041 (Order 82-28), § 296-127-040, filed 8/27/82.]

WAC 296-127-045 Affidavit of wages paid. (1) All affidavits of wages paid submitted to the industrial statistician of the department shall be accompanied by a fee of twenty-five dollars for each affidavit of wages paid. All fees shall be made payable to the department of labor and industries.

(2) Any agency, division, or department of the state of Washington which through agreement with the department certifies affidavits of wages paid for its own contracts shall provide to the industrial statistician each month the number of affidavit of wages paid it has certified and quarterly shall send a fee of twenty dollars for each affidavit of wages paid it has certified. This fee shall be sent to the industrial statistician and be made payable to the department of labor and industries.

[Statutory Authority: RCW 39.12.070. 94-01-100, § 296-127-045, filed 12/16/93, effective 1/16/94. Statutory Authority: RCW 43.22.270. 90-24-053, § 296-127-045, filed 12/3/90, effective 1/3/91. Statutory Authority: Chapters 39.04 and 39.12 RCW and RCW 43.22.270. 88-22-046 (Order 88-22), § 296-127-045, filed 10/31/88. Statutory Authority: RCW 39.12.015, 39.12.060 and House Bill 795, 1982 1st ex.s. c 38. 82-18-041 (Order 82-28), § 296-127-045, filed 8/27/82.]

WAC 296-127-050 Filing of statements of intent to pay prevailing wages and affidavits of wages paid for contracts under two thousand five hundred dollars. A contract awarding agency may, as part of a public works contract, enter into an agreement with a contractor to approve statements of intent to pay prevailing wages and affidavits of wages paid on behalf of the department for contracts wherein the total amount does not exceed two thousand five hundred dollars as provided in RCW 39.12.040(2), pursuant to the following terms:

(1) The agreement must be incorporated into the bid specifications and contract document;

(2) Statement of intent forms and affidavit of wages paid forms, provided by the department, must be filed with the contract awarding agency by the contractor prior to the disbursement of public funds;

(3) Contract awarding agencies must retain copies of all statements of intent to pay prevailing wages received pursuant to this section for a period of not less than three years;

(4) Contract awarding agencies must send to the department copies of all affidavits of wages paid received pursuant to this section within thirty days of receipt from the contractor;

(5) The contract awarding agency shall accept full responsibility and liability for payment of any valid wage claims directly to the claimant;

(6) The contract awarding agency may proceed against any contractor found to have violated the provisions of the statute, and may debar such contractor from consideration

for future contracts for up to one year and will provide the department with the names and contractor registration or other employer identification numbers of any such debarred contractors within thirty days of the debarment; and

(7) Contract awarding agencies and contractors shall not enter into contracts or agreements to perform public work that subdivide or otherwise disaggregate any public works project of more than two thousand five hundred dollars, to enable such public works project to be awarded pursuant to this section.

[Statutory Authority: Chapters 39.04 and 39.12 RCW and RCW 43.22.270. 92-01-104, § 296-127-050, filed 12/18/91, effective 1/31/92.]

WAC 296-127-060 Director of department of labor and industries to arbitrate disputes—General provisions.

(1) The contract executed between a public authority and the successful bidder or contractor and all of his subcontractors shall contain a provision that in case any dispute arises as to what are the prevailing rates of wages for a specific trade, craft or occupation and such dispute cannot be adjusted by the parties in interest, including labor and management representatives, the matter shall be referred for arbitration to the director, and his decision shall be final, conclusive, and binding on all parties involved in the dispute.

(2) In exercising his authority to hear and decide disputes the director shall consider among other things, timeliness, the nature of the relief sought, matters of undue hardship or injustice, or public interest. A "timely" request for arbitration is one received within 30 days after the contract has been awarded.

(3) Any party in interest who is seeking a modification or other change in a wage determination under RCW 39.12.015, and who has requested the industrial statistician to make such modification or other change and the request has been denied, after appropriate reconsideration by the assistant director shall have a right to petition for arbitration of the determination.

(a) For purpose of this section, the term "party in interest" is considered to include, without limitation:

(i) Any contractor, or an association representing a contractor, who is likely to seek or to work under a contract containing a particular wage determination, or any worker, laborer or mechanic, or any council of unions or any labor organization which represents a laborer or mechanic who is likely to be employed or to seek employment under a contract containing a particular wage determination, and

(ii) Any public agency concerned with the administration of a proposed contract or a contract containing a particular wage determination issued pursuant to chapter 39.12 RCW.

(b) For good cause shown, the director may permit any party in interest to intervene or otherwise participate in any proceeding held by the director. A petition to intervene or otherwise participate shall be in writing, and shall state with precision and particularity:

(i) The petitioner's relationship to the matters involved in the proceedings, and

(ii) The nature of the presentation which he would make. Copies of the petition shall be served on all parties or interested persons known to be participating in the

proceeding, who may respond to the petition. Appropriate service shall be made of any response.

[Statutory Authority: RCW 39.12.015, 39.12.060 and House Bill 795, 1982 1st ex.s. c 38. 82-18-041 (Order 82-28), § 296-127-060, filed 8/27/82.]

WAC 296-127-061 Requests for arbitration. (1)

The petition for arbitration (original and four copies) shall be filed with Director, Department of Labor and Industries, General Administration Building, Olympia, Washington 98504. In addition, copies of the petition shall be served personally or by mail upon each of the following:

- (a) The public agency or agencies involved,
- (b) The industrial statistician, and
- (c) Any other person (or the authorized representatives of such person) known to be interested in the subject matter of the petition.

(2) The director shall under no circumstances request any administering agency to postpone any contract performance because of the filing of a petition. This is a matter which must be resolved directly with the administering agency by the petitioner or other party in interest.

(3) A petition for arbitration of a wage determination shall:

- (a) Be in writing and signed by the petitioner or his counsel (or other authorized representative), and
- (b) Identify clearly the wage determination, location of project or projects in question, and the agency concerned, and
- (c) State that the petitioner has requested reconsideration of the wage determination in question and describe briefly the action taken in response to the request, and
- (d) Contain a short and plain statement of the grounds for review, and
- (e) Be accompanied by supporting data, views, or arguments, and
- (f) Be accompanied by a filing fee of \$75.00. Fees shall be made payable to the department of labor and industries.

[Statutory Authority: RCW 39.12.015, 39.12.060 and House Bill 795, 1982 1st ex.s. c 38. 82-18-041 (Order 82-28), § 296-127-061, filed 8/27/82.]

WAC 296-127-062 Conduct of arbitration hearing.

(1) Interested persons other than the petitioner shall have a reasonable opportunity as specified by the director in particular cases to submit to the director written data, views, or arguments relating to the petition. Such material (original and four copies) shall be filed with the Director, Department of Labor and Industries, General Administration Building, Olympia, Washington 98504 and be accompanied by a filing fee of \$35.00. Fees shall be made payable to the department of labor and industries. Copies of any such material shall be served on the petitioner and other interested persons.

(2) Each party in interest shall have the right to appear in person or by or with counsel or other qualified representatives in any proceeding before the director. If all parties agree, oral testimony may be waived and arguments submitted in writing.

(3) Upon his own initiative or upon motion of any interested person or party, the director may consolidate in any proceeding or concurrently consider two or more appeals which involve substantially the same persons or parties, or

issues which are the same or closely related, if he finds that such consolidation or concurrent review will contribute to an efficient review and to the ends of justice, and it will not unduly delay consideration of any such appeals.

(4) The director shall prescribe the time and place for hearing. The director shall schedule the hearing within 45 days of the request. For good cause shown, the director may allow a continuance at the request of a party in interest.

(a) With respect to any proceeding before him, the director may upon his own initiative or upon the request of any interested person or party direct the interested persons or parties to appear before the director at a specified time and place in order to simplify the issues presented or to take up any other matters which may tend to expedite or otherwise facilitate the disposition of the proceeding.

(b) All papers submitted to the director under this section shall be filed with the Department of Labor and Industries, General Administration Building, Olympia, Washington 98504. An original and four copies of all papers shall be submitted. Service under this part shall be by the filing party or interested person; service may be personal or may be by mail. Service by mail is complete on mailing.

(5) The final disposition shall be by the director.

(a) The director may decline review of any case whenever in his judgment a review would be inappropriate or because of the lack of timeliness, the nature of the relief sought, or other reasons.

(b) The director shall decide the case upon the basis of all relevant matter contained in the entire record before him but the director may utilize his experience, technical competence, and specialized knowledge in evaluating the evidence.

(c) Upon reasonable notice to the parties or interested persons, the director may vary the procedures specified in this part in particular cases.

(6) The director may allow all parties a period of ten days for filing post-hearing briefs prior to closing the record and concluding the hearing.

(7) The director shall issue a written decision within 30 days of the conclusion of the hearing. A copy shall be sent to each party in interest.

[Statutory Authority: RCW 39.12.015, 39.12.060 and House Bill 795, 1982 1st ex.s. c 38. 82-18-041 (Order 82-28), § 296-127-062, filed 8/27/82.]

WAC 296-127-130 Filing of complaint.

Any interested party, as defined in RCW 39.12.010(4) may file with the department a complaint alleging a violation of the prevailing wage laws. The complaint must describe the alleged violation and identify the alleged violator. It would aid the department's investigation if the complaint also specifies:

- (1) The name and address of the complainant;
- (2) The address of the alleged violator;
- (3) The name and address of the public agency that awarded the contract;
- (4) The date the public agency accepted the completed public work (if applicable);
- (5) The specific rates of wages paid by the violator and the rates that allegedly should be paid;
- (6) The exact amount of prevailing wages that are alleged to remain unpaid; and

(7) The date the bids were due on the public works project.

[Statutory Authority: RCW 39.12.050, 39.12.065, 43.22.270 and 51.04.020, 86-03-063 (Order 85-28), § 296-127-130, filed 1/17/86.]

WAC 296-127-140 Investigation of complaint. (1)

The department shall investigate a complaint filed by an interested party unless the complaint was filed more than thirty days after the date the public agency accepted the public work that gave rise to the complaint. The department may, in its sole discretion, investigate a complaint filed more than thirty days after the acceptance date. However, the department may not charge a contractor with a violation of RCW 39.12.065 if the complaint is filed after the thirty-day limit.

The department's investigation shall determine whether a violation of RCW 39.12.065 or 39.12.050, or both, or of any other provision of chapter 39.12 RCW, occurred.

(2) If the department's investigation substantiates a complaint that alleges that a contractor has violated RCW 39.12.065, the department is required to attempt to collect unpaid wages for the contractor's employees. During the investigation, the department should be able to identify the affected employees. The department shall direct to the affected employees the best notice practicable under the circumstances, including individual notice to all employees who can be identified through reasonable effort. The notice shall inform the employee that (a) the department's final order, whether favorable or not, will apply to all employees; (b) any employee may, if he or she desires, move to intervene as a party in any hearing held as a result of the investigation; and (c) that the employee may have a private right of action to collect unpaid prevailing wages.

[Statutory Authority: RCW 39.12.050, 39.12.065, 43.22.270 and 51.04.020, 86-03-063 (Order 85-28), § 296-127-140, filed 1/17/86.]

WAC 296-127-150 Notice of violation. (1) If the department determines after its investigation that there is reasonable cause to believe that the prevailing wage law has been violated, the department shall notify the violator of its determination. The notice of violation shall be served on the violator personally or by certified mail.

(2) The notice of violation shall:

- (a) Describe concisely the violation;
- (b) Specify which statute or statutes were violated;
- (c) If known, identify the laborers, workers, and mechanics who are affected by the violation;

(d) If known, state the amount of unpaid prevailing wages the violator owes;

(e) State that an employee cannot by contract or agreement waive the right to receive the prevailing wage;

(f) State the penalty that the department will assess for a violation, if any, of RCW 39.12.065 and 39.12.050; and

(g) State the date the complaint was filed with the department.

(3) RCW 39.12.065 and 39.12.050 establish the penalty amounts.

(4) If the notice alleges a violation of RCW 39.12.065, the department shall serve a copy of the notice of violation on the violator's sureties under chapters 39.08, 18.27, 19.28, and 60.28 RCW.

(5) The notice of violation shall inform the violator and, if a violation of RCW 39.12.065 is alleged, its sureties that they may request a hearing on the violations, the amount of unpaid prevailing wages owed, or the penalties assessed. The notice shall specify that if no hearing is requested within thirty days of the date of issuance of the notice the director shall issue a final, unappealable order finding that the violation did occur, ordering the violator to pay any unpaid prevailing wages, and assessing penalties.

[Statutory Authority: RCW 39.12.050, 39.12.065, 43.22.270 and 51.04.020, 86-03-063 (Order 85-28), § 296-127-150, filed 1/17/86.]

WAC 296-127-160 Appeal of notice of violation.

The violator or any of its sureties who are interested in the matter may request a hearing on a notice of violation. One original and four copies of the request must be filed with the director within thirty days after the date the department issued the notice. The party requesting the hearing must also serve a copy of the notice on all interested sureties and, if the requestor is a surety, on the violator.

The request for hearing must be in writing and must specify:

- (1) The name and address of the party requesting the hearing;
- (2) The notice of violation that is being appealed;
- (3) The items of the notice of violation that the requestor believes are erroneous; and
- (4) The reasons the notice of violation is erroneous.

[Statutory Authority: RCW 39.12.050, 39.12.065, 43.22.270 and 51.04.020, 86-03-063 (Order 85-28), § 296-127-160, filed 1/17/86.]

WAC 296-127-170 Hearing on notice of violation.

(1) The director may hear the appeal personally or may delegate the authority to hold the hearing and draft a proposed decision to an administrative law judge pursuant to chapter 34.12 RCW. The plaintiff in the hearing shall be the department, and the defendants shall be the violator and its interested sureties. The department shall have the burden of proving, by a preponderance of the evidence, that the violations occurred and that any wages were unpaid as stated in the notice.

(2) Any interested party may upon motion, be allowed to intervene as a plaintiff in the hearing. "Standing" shall be construed broadly to effectuate the remedial purposes of the prevailing wage law. An interested party, whether or not admitted as a plaintiff, may submit written arguments and affidavits. The parties shall be given an opportunity to respond to or rebut any arguments and affidavits before the person presiding over the hearing makes his or her decision.

(3) The hearing shall be conducted in accordance with the Uniform procedure rules, chapter 1-08 WAC.

(4) If the director presides over the hearing, the director shall issue a final decision that includes findings of fact and conclusions of law, and if appropriate an order to pay unpaid prevailing wages, a penalty, or both.

(5) If an administrative law judge presides over the hearing, she or he shall issue a proposed decision that includes findings of fact, conclusions of law, and if appropriate an order to pay unpaid prevailing wages, a penalty, or both. The proposed decision shall be served by certified mail or personally on the violator, the interested sureties, the

department, and any interested parties who have intervened as plaintiffs. Any of these parties, if aggrieved by the proposed decision, may appeal to the director within thirty days after the date of issuance of the proposed decision. If none of the parties appeals within thirty days, the proposed decision may not be appealed either to the director or the courts.

(6) An appellant must file with the director an original and four copies of its notice of appeal. The notice of appeal must specify which findings and conclusions are erroneous. The appellant must attach to the notice the written arguments supporting its appeal.

The appellant must serve a copy of the notice of appeal and the arguments on the other parties. The respondent parties must file with the director their written arguments within thirty days after the date the notice of appeal and the arguments were served upon them.

(7) The director shall review the proposed decision in accordance with the Administrative Procedure Act, chapter 34.04 RCW. The director may: Allow the parties to present oral arguments as well as the written arguments; require the parties to specify the portions of the record on which the parties rely; require the parties to submit additional information by affidavit or certificate; remand the matter to the administrative law judge for further proceedings; and require a departmental employee to prepare a summary of the record for the director to review. The director shall issue a final decision that can affirm, modify, or reverse the proposed decision.

(8) The director shall serve the final decision on all parties. Any aggrieved party may appeal the final decision to superior court pursuant to RCW 34.04.130 unless the final decision affirms an unappealed proposed decision. If no party appeals within the period set by RCW 34.04.130, the director's decision is conclusive and binding on all parties.

[Statutory Authority: RCW 39.12.050, 39.12.065, 43.22.270 and 51.04.020. 86-03-063 (Order 85-28), § 296-127-170, filed 1/17/86.]

WAC 296-127-180 Effect of final decision finding a violation of RCW 39.12.065. If the director issues a final decision that includes a finding that a contractor violated RCW 39.12.065 and that the contractor owes unpaid prevailing wages, and the finding is not timely appealed or is affirmed by the courts, the findings and the decision are res judicata in any action by the department or by any interested party who was a plaintiff at the hearing, against the contractor and its sureties to recover the unpaid prevailing wages. The findings and decision are not res judicata in any action by an interested party who was not a plaintiff at the hearing.

[Statutory Authority: RCW 39.12.050, 39.12.065, 43.22.270 and 51.04.020. 86-03-063 (Order 85-28), § 296-127-180, filed 1/17/86.]

WAC 296-127-190 Filing of lien against retainage or bonds. (1) Upon receipt of a timely complaint that a contractor has violated RCW 39.12.065, and that the contractor owes unpaid prevailing wages, the department may file a lien against the retainage or bond obtained by the contractor under RCW 60.28.010.

(2) Upon issuance by the director of a final decision that finds that a contractor has violated RCW 39.12.065 or 39.12.050, and that sets a civil penalty for the violation, the

department shall file liens for the penalty amount against the retainage and bonds the contractor obtained under RCW 39.12.065 (2)(c), 39.08.010, and 60.28.010.

[Statutory Authority: RCW 39.12.050, 39.12.065, 43.22.270 and 51.04.020. 86-03-063 (Order 85-28), § 296-127-190, filed 1/17/86.]

WAC 296-127-200 Surety bond payable to director.

(1) RCW 39.12.065 (2)(c) authorizes the director to require a contractor to obtain a surety bond "running to the director in the amount of the violation found." The intent and wording indicates that the director may require such a bond only after issuing a final decision finding that the contractor has violated RCW 39.12.065.

(2) The director may demand that a violating contractor post the bond when:

(a) The director has issued a final decision that finds that the contractor owes unpaid prevailing wages or a penalty, whether or not the decision has been appealed to the courts; and

(b) The retainage or bonds provided under RCW 60.28.010, 18.27.040, and 19.28.120 are or may be insufficient to pay the amount of prevailing wages or the penalty owed.

(3) A contractor may at any time voluntarily obtain a bond running to the director to guarantee the payment of the prevailing wages and any penalty. The contractor may allow the director to satisfy any claim for unpaid wages or the penalty from this bond instead of from the retainage or bonds obtained under RCW 60.28.010, 18.27.040, 19.28.120, and 39.08.010.

[Statutory Authority: RCW 39.12.050, 39.12.065, 43.22.270 and 51.04.020. 86-03-063 (Order 85-28), § 296-127-200, filed 1/17/86.]

WAC 296-127-210 Suit against retainage and bonds. (1) If the director issues a final decision that includes a finding that the contractor has violated RCW 39.12.065 or 39.12.050, and the finding is not timely appealed or is affirmed by the courts, the department may file suit against the appropriate retainage and bonds to recover the amount of unpaid prevailing wages or the civil penalty.

(2) The department may, before issuance of a final decision, file suit against the appropriate retainage and bonds to recover unpaid prevailing wages if the filing of a suit is necessary to preserve the claim. The suit shall be held in abeyance pending the exhaustion of administrative remedies.

[Statutory Authority: RCW 39.12.050, 39.12.065, 43.22.270 and 51.04.020. 86-03-063 (Order 85-28), § 296-127-210, filed 1/17/86.]

WAC 296-127-220 Distribution of recovery. (1) Upon making a recovery pursuant to RCW 39.12.065(2) against a contractor's retainage or bonds, the department shall distribute the proceeds and any award of attorneys' fees and costs as follows:

(a) The recovery shall be paid to the employees of the violator who did not receive the correct prevailing wage. The distribution among employees shall be based on the evidence of wage loss produced at the hearing on the violation.

(b) Next shall be paid the costs the department incurred in making the recovery. The department shall pay these

costs from the attorney's fees and costs awarded by the courts.

(2) A contractor who is the subject of an investigation or who has received a notice of violation may choose not to contest the matter and may tender to the department the amount of unpaid prevailing wages the department determines is owed. The department, after identifying and notifying the affected employees pursuant to WAC 296-127-140, shall accept the tender if the contractor in writing acknowledges that the department, by accepting the tendered amount, does not absolve the contractor from liability to any employee for unpaid prevailing wages.

(3) If an employee for whom the department has recovered unpaid prevailing wages cannot be found, the department shall retain the wages for the one-year period required by RCW 63.29.150. After the statutory period has lapsed, the department shall pay the wages to the department of revenue in accordance with RCW 63.29.170.

[Statutory Authority: RCW 39.12.050, 39.12.065, 43.22.270 and 51.04.020. 86-03-063 (Order 85-28), § 296-127-220, filed 1/17/86.]

WAC 296-127-300 Filing and service. All papers required to be filed with the director under this chapter or chapter 39.12 RCW shall be addressed to Director, Department of Labor and Industries, General Administration Building, Olympia, WA. 98504.

Filing and service shall be made as allowed by WAC 1-08-090 through 1-08-140.

[Statutory Authority: RCW 39.12.050, 39.12.065, 43.22.270 and 51.04.020. 86-03-063 (Order 85-28), § 296-127-300, filed 1/17/86.]

WAC 296-127-310 List of violators. The department shall maintain a list of all contractors who are forbidden to bid on a public works project, or to have a bid accepted, pursuant to RCW 39.12.065(3) or 39.12.050. To the extent required by RCW 39.12.065(3) and 39.12.050, the industrial statistician shall refuse to certify any statement of intent to pay the prevailing wage or affidavit of wages paid that he or she determines was submitted by a contractor on the list. Because the department receives a large number of requests for certification, the department shall not be liable to any person or entity for certifying a statement or an affidavit of a contractor on the list.

The industrial statistician shall make the list available upon request.

[Statutory Authority: RCW 39.12.050, 39.12.065, 43.22.270 and 51.04.020. 86-03-063 (Order 85-28), § 296-127-310, filed 1/17/86.]

WAC 296-127-320 Payroll. (1) Each contractor shall keep accurate payroll records for three years from the date of acceptance of the public works project by the contract awarding agency, showing the name, address, Social Security number, trade or occupation, straight time rate, hourly rate of usual benefits as defined by WAC 296-127-014(1), and overtime hours worked each day and week, including any employee authorizations executed pursuant to WAC 296-127-022, and the actual rate of wages paid, for each laborer, worker, and mechanic employed by the contractor for work performed on a public works project.

(2) A contractor shall, within ten days after it receives a written request, from the department or from any interested

party as defined by RCW 39.12.010(4), file a certified copy of the payroll records with the agency that awarded the public works contract and with the department.

(3) A contractor's noncompliance with this section shall constitute a violation of RCW 39.12.050.

[Statutory Authority: Chapters 39.04 and 39.12 RCW and RCW 43.22.270. 92-01-104, § 296-127-320, filed 12/18/91, effective 1/31/92. Statutory Authority: RCW 39.12.050, 39.12.065, 43.22.270 and 51.04.020. 86-03-063 (Order 85-28), § 296-127-320, filed 1/17/86.]

WAC 296-127-400 Applicability. WAC 296-127-400 through 296-127-470 are issued pursuant to RCW 39.12.022, authorizing the director of the department of labor and industries, to the extent necessary in order to prevent curtailment of opportunities for employment, to issue special subprevailing wage certificates for employment of individuals whose earning capacity is impaired by physical or mental deficiency or injury at wages lower than the prevailing rate applicable under RCW 39.12.020. Subprevailing wage certificates shall be subject to the conditions prescribed in these regulations.

[Statutory Authority: RCW 39.12.022. 90-19-061, § 296-127-400, filed 9/17/90, effective 10/18/90.]

WAC 296-127-410 Definitions. For the purposes of WAC 296-127-400 through 296-127-470:

(1) "Developmental disability" means a disability attributable to mental retardation, cerebral palsy, epilepsy, autism, or another neurological or other condition of an individual found by the secretary of social and health services to be closely related to mental retardation or to require treatment similar to that required for individuals with mental retardation, which disability originates before the individual attains age eighteen, which has continued or can be expected to continue indefinitely, and which constitutes a substantial handicap to the individual.

(2) "Handicapped worker" means an individual whose earning capacity for the work to be performed is impaired by physical or mental deficiency or injury.

(3) "Prevailing rate" means the prevailing rate of wage as defined in RCW 39.12.010 and as determined by the industrial statistician.

[Statutory Authority: RCW 39.12.022. 90-19-061, § 296-127-410, filed 9/17/90, effective 10/18/90.]

WAC 296-127-420 Application for a subprevailing wage certificate. (1) Nonprofit vocational rehabilitation programs may apply for a subprevailing wage certificate authorizing the employment of one or more handicapped workers with a developmental disability at less than the prevailing rate. An application for each worker shall be filed with the office of the industrial statistician not less than annually upon forms approved by the director or an authorized representative of the director.

(2) The application shall be signed jointly by the employer, the handicapped worker for whom such application is being made, and by the parent or guardian of the handicapped worker except as otherwise authorized by the director or an authorized representative of the director.

[Statutory Authority: RCW 39.12.022. 90-19-061, § 296-127-420, filed 9/17/90, effective 10/18/90.]

WAC 296-127-430 Conditions for granting a subprevailing wage certificate. (1) A subprevailing wage certificate may be issued to a nonprofit vocational rehabilitation program if the application is in proper form and sets forth facts showing:

(a) A wage below prevailing rate is necessary to prevent curtailment of the handicapped worker's opportunities for employment;

(b) The handicap impairs the earning capacity of the worker for the work to be performed;

(c) The percentage of full productivity at which the handicapped worker functions; and

(d) A description of the duties to be performed by each handicapped worker;

(e) The nature of the disability; and

(f) An addendum containing a detailed explanation of the nature of the disability.

(2) The industrial statistician shall not require a nonprofit vocational rehabilitation program to provide the information required in subsection (1)(f) of this section if it provides a notarized copy of a federal certificate granted by the United States department of labor under section 14(c) of the Federal Fair Labor Standards Act and any documentation deemed necessary by the industrial statistician identifying the workers with a developmental disability, a description of the duties to be performed, and the percentage of productivity at which each worker functions.

(3) The director or an authorized representative of the director may require the submission of additional information to that required by subsection (1) or (2) of this section shown on the application and may require the handicapped worker to take a medical examination where it is deemed necessary in order to determine whether or not the issuance of a certificate is justified.

[Statutory Authority: RCW 39.12.022. 90-19-061, § 296-127-430, filed 9/17/90, effective 10/18/90.]

WAC 296-127-440 Issuance of a subprevailing wage certificate. If the application and other available information indicate that the requirements of this regulation are satisfied, the director or an authorized representative of the director may issue a subprevailing wage certificate. If issued, copies of the subprevailing wage certificate shall be mailed to the employer, the handicapped worker, and to the parent or guardian of the handicapped worker. If denied, the employer, the handicapped worker, and the parent or guardian of the handicapped worker shall be given written notice of the denial.

[Statutory Authority: RCW 39.12.022. 90-19-061, § 296-127-440, filed 9/17/90, effective 10/18/90.]

WAC 296-127-450 Terms of subprevailing wage certificate. (1) A subprevailing wage certificate shall specify, among other things, the names of the handicapped workers, the name of the employer, the duties to be performed by the handicapped worker, the percentage of the prevailing rate authorized to be paid, and the period of time during which that percentage of the prevailing rate may be paid. A certificate shall also indicate that the percentage of the prevailing rate to be paid a handicapped worker shall change to reflect an increase or decrease in the worker's

productivity when the worker's productivity is determined to change.

(2) A subprevailing wage certificate shall be effective for a period of one year or less as designated by the director or an authorized representative of the director. A handicapped worker employed under such certificate may be paid at the specified percentage of the prevailing rate only during the effective period of the certificate.

(3) Notwithstanding the requirements of chapter 49.46 RCW and its administrative regulations, the percentage of the prevailing rate authorized to be paid shall be fixed at a figure designed to reflect adequately the percentage of productivity at which the handicapped worker functions.

(4) Any money received by a handicapped worker by reason of any state or federal pension or compensation program for handicapped persons shall not be considered as offsetting any part of the wage or remuneration due the handicapped worker by the employer.

(5) A handicapped worker shall be paid not less than one and one-half times the rate specified in the subprevailing wage certificate for hours worked in excess of forty hours per workweek or eight hours per day.

(6) The terms of any subprevailing wage certificate, including the percentage of the prevailing rate authorized to be paid, may be amended by the director or an authorized representative of the director upon written notice to the parties concerned, if the facts justify such amendment.

[Statutory Authority: RCW 39.12.022. 90-19-061, § 296-127-450, filed 9/17/90, effective 10/18/90.]

WAC 296-127-460 Renewal of subprevailing wage certificate. Application for renewal of any subprevailing wage certificate shall be filed in the same manner as an original application. An application for renewal shall include the most recent evaluation conducted within the past year of the productivity level at which the handicapped worker functions. If such application has been filed prior to the expiration date of the certificate, the certificate shall remain in effect until the application for renewal has been granted or denied.

[Statutory Authority: RCW 39.12.022. 90-19-061, § 296-127-460, filed 9/17/90, effective 10/18/90.]

WAC 296-127-470 Review. Any person aggrieved by any action of the director or an authorized representative of the director taken pursuant to this regulation may, within fifteen days after notice of such action has been mailed, file with the director a petition for review of the action complained of, setting forth grounds for seeking such review. If reasonable grounds exist, the director or an authorized representative of the director may grant such review and to the extent deemed appropriate afford all interested persons an opportunity to be heard on such review.

[Statutory Authority: RCW 39.12.022. 90-19-061, § 296-127-470, filed 9/17/90, effective 10/18/90.]

WAC 296-127-990 Severability. If any provision of this chapter or its application to any persons or circumstances is held invalid by state or federal court, the remainder of the chapter or the application of the provision to other persons or circumstances is not affected.

[Statutory Authority: Chapters 39.04 and 39.12 RCW and RCW 43.22.270. 92-01-104, § 296-127-990, filed 12/18/91, effective 1/31/92.]

Chapter 296-128 WAC MINIMUM WAGES

WAC

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DISPOSITION OF SECTIONS FORMERLY CODIFIED IN THIS CHAPTER

296-128-410	Counselor staff occupations in organized seasonal recreational camps—Women and minors. [Industrial Welfare Order 11-63, filed 9/13/63; Minimum Wage and Welfare Order 54, filed 3/23/60.] Repealed by Order 77-32, filed 12/30/77. Later promulgation, see chapter 296-125 WAC.
296-128-415	Food processing industry—Women and minors. [Industrial Welfare Order 5-62, filed 11/25/64; Minimum Wage and Welfare Order 51, filed 3/23/60.] Repealed by Order 77-32, filed 12/30/77. Later promulgation, see chapter 296-125 WAC.
296-128-420	Fresh fruit and vegetable packing industry—Women and minors. [Industrial Welfare Order 6-62, filed 11/25/64; Minimum Wage and Welfare Order 52, filed 3/23/60.] Repealed by Order 77-32, filed 12/30/77. Later promulgation, see chapter 296-125 WAC.
296-128-425	General amusement and recreation industry—Women and minors. [Industrial Welfare Order 8-62, filed 11/25/64; Minimum Wage Order 45-A, filed 3/23/60.] Repealed by Order 77-32, filed 12/30/77. Later promulgated, see chapter 296-125 WAC.
296-128-430	Health care industry—Women and minors. [Industrial Welfare Order 68-3, filed 5/8/68, effective 7/15/68; Industrial Welfare Order 10-62, filed 11/25/64; Minimum Wage Order 46, filed 3/23/60.] Repealed by Order 77-32, filed 12/30/77. Later promulgation, see chapter 296-125 WAC.
296-128-435	Laundry, dry-cleaning and dye works industry—Women and minors. [Industrial Welfare Order 3-62, filed 11/25/64; Minimum Wage and Welfare Order 48, filed 3/23/60.] Repealed by Order 77-32, filed 12/30/77. Later promulgation, see chapter 296-125 WAC.
296-128-440	Manufacturing industry and general working conditions—Women and minors. [Industrial Welfare Order 2-62, filed 11/25/64; Minimum Wage and Welfare Order 50, filed 3/23/60.] Repealed by Order 77-32, filed 12/30/77. Later promulgation, see chapter 296-125 WAC.
296-128-445	Mercantile industry, wholesale and retail—Women and minors. [Order 71-5, § 296-128-445, filed 5/26/71, effective 7/1/71, Mercantile Industrial Welfare Order 1-71; Industrial Welfare Order 1-62, filed 11/25/64; Minimum Wage Order 44, filed 3/23/60.] Repealed by Order 77-32, filed 12/30/77. Later promulgation, see chapter 296-125 WAC.
296-128-4451	Applicability. [Order 71-5, § 296-128-4451, filed 5/26/71, effective 7/1/71.] Repealed by Order 77-32, filed 12/30/77. Later promulgation, see chapter 296-125 WAC.
296-128-4452	Definitions. [Order 71-5, § 296-128-4452, filed 5/26/71, effective 7/1/71.] Repealed by Order 77-32, filed 12/30/77. Later promulgation, see chapter 296-125 WAC.
296-128-4453	Minimum wages. [Order 71-5, § 296-128-4453, filed 5/26/71, effective 7/1/71.] Repealed by Order 77-32, filed 12/30/77. Later promulgation, see chapter 296-125 WAC.
296-128-4454	Deductions. [Order 71-5, § 296-128-4454, filed 5/26/71, effective 7/1/71.] Repealed by Order 77-32, filed 12/30/77. Later promulgation, see chapter 296-125 WAC.
296-128-4455	Statements furnished. [Order 71-5, § 296-128-4455, filed 5/26/71, effective 7/1/71.] Repealed by Order 77-32, filed 12/30/77. Later promulgation, see chapter 296-125 WAC.
296-128-4456	Records. [Order 71-5, § 296-128-4456, filed 5/26/71, effective 7/1/71.] Repealed by Order 77-32, filed 12/30/77. Later promulgation, see chapter 296-125 WAC.

- 296-128-4457 Meal and rest periods. [Order 71-5, § 296-128-4457, filed 5/26/71, effective 7/1/71.] Repealed by Order 77-32, filed 12/30/77. Later promulgation, see chapter 296-125 WAC.
- 296-128-4458 Working conditions. [Order 71-5, § 296-128-4458, filed 5/26/71, effective 7/1/71.] Repealed by Order 77-32, filed 12/30/77. Later promulgation, see chapter 296-125 WAC.
- 296-128-4459 Uniforms. [Order 71-5, § 296-128-4459, filed 5/26/71, effective 7/1/71.] Repealed by Order 77-32, filed 12/30/77. Later promulgation, see chapter 296-125 WAC.
- 296-128-446 Minor work permits. [Order 71-5, § 296-128-446, filed 5/26/71, effective 7/1/71.] Repealed by Order 77-32, filed 12/30/77. Later promulgation, see chapter 296-125 WAC.
- 296-128-4461 Posting of order. [Order 71-5, § 296-128-4461, filed 5/26/71, effective 7/1/71.] Repealed by Order 77-32, filed 12/30/77. Later promulgation, see chapter 296-125 WAC.
- 296-128-4462 Separability. [Order 71-5, § 296-128-4462, filed 5/26/71, effective 7/1/71.] Repealed by Order 77-32, filed 12/30/77. Later promulgation, see chapter 296-125 WAC.
- 296-128-4463 Penalties. [Order 71-5, § 296-128-4463, filed 5/26/71, effective 7/1/71.] Repealed by Order 77-32, filed 12/30/77. Later promulgation, see chapter 296-125 WAC.
- 296-128-450 Office workers—Women and minors. [Industrial Welfare Order 13-63, filed 11/25/64; Minimum Wage Order 43, filed 3/23/60; Statement of interpretation of applicability of Industrial Welfare Committee Order 13-63, office workers, filed 11/25/64.] Repealed by Order 77-32, filed 12/30/77. Later promulgation, see chapter 296-125 WAC.
- 296-128-455 Personal service industry—Women and minors. [Industrial Welfare Order 4-62, filed 11/25/64.] Repealed by Order 77-32, filed 12/30/77. Later promulgation, see chapter 296-125 WAC.
- 296-128-460 Public housekeeping industrial—Women and minors. [Order 71-5 (Industrial Welfare Order No. 9-71), § 296-128-460, filed 5/26/71, effective 7/1/71; Industrial Welfare Order 9-62, filed 11/25/64; Minimum Wage Order 46, filed 3/23/60.] Repealed by Order 77-32, filed 12/30/77. Later promulgation, see chapter 296-125 WAC.
- 296-128-4601 Applicability. [Order 71-5, § 296-128-4601, filed 5/26/71, effective 7/1/71.] Repealed by Order 77-32, filed 12/30/77. Later promulgation, see chapter 296-125 WAC.
- 296-128-4602 Definitions. [Order 71-5, § 296-128-4602, filed 5/26/71, effective 7/1/71.] Repealed by Order 77-32, filed 12/30/77. Later promulgation, see chapter 296-125 WAC.
- 296-128-4603 Minimum wages. [Order 71-5, § 296-128-4603, filed 5/26/71, effective 7/1/71.] Repealed by Order 77-32, filed 12/30/77. Later promulgation, see chapter 296-125 WAC.
- 296-128-4604 Deductions. [Order 71-5, § 296-128-4604, filed 5/26/71, effective 7/1/71.] Repealed by Order 77-32, filed 12/30/77. Later promulgation, see chapter 296-125 WAC.
- 296-128-4605 Statements furnished. [Order 71-5, § 296-128-4605, filed 5/26/71, effective 7/1/71.] Repealed by Order 77-32, filed 12/30/77. Later promulgation, see chapter 296-125 WAC.
- 296-128-4606 Records. [Order 71-5, § 296-128-4606, filed 5/26/71, effective 7/1/71.] Repealed by Order 77-32, filed 12/30/77. Later promulgation, see chapter 296-125 WAC.
- 296-128-4607 Meals and lodging. [Order 71-5, § 296-128-4607, filed 5/26/71, effective 7/1/71.] Repealed by Order 77-32, filed 12/30/77. Later promulgation, see chapter 296-125 WAC.
- 296-128-4608 Meal and rest periods. [Order 71-5, § 296-128-4608, filed 5/26/71, effective 7/1/71.] Repealed by Order 77-32, filed 12/30/77. Later promulgation, see chapter 296-125 WAC.
- 296-128-4609 Working conditions. [Order 71-5, § 296-128-4609, filed 5/26/71, effective 7/1/71.] Repealed by Order 77-32, filed 12/30/77. Later promulgation, see chapter 296-125 WAC.
- 296-128-461 Uniforms. [Order 71-5, § 296-128-461, filed 5/26/71, effective 7/1/71.] Repealed by Order 77-32, filed 12/30/77. Later promulgation, see chapter 296-125 WAC.
- 296-128-4611 Minor work permits. [Order 71-5, § 296-128-4611, filed 5/26/71, effective 7/1/71.] Repealed by Order 77-32, filed 12/30/77. Later promulgation, see chapter 296-125 WAC.
- 296-128-4612 Posting of order. [Order 71-5, § 296-128-4612, filed 5/26/71, effective 7/1/71.] Repealed by Order 77-32, filed 12/30/77. Later promulgation, see chapter 296-125 WAC.
- 296-128-4613 Separability. [Order 71-5, § 296-128-4613, filed 5/26/71, effective 7/1/71.] Repealed by Order 77-32, filed 12/30/77. Later promulgation, see chapter 296-125 WAC.
- 296-128-4614 Penalties. [Order 71-5, § 296-128-4614, filed 5/26/71, effective 7/1/71.] Repealed by Order 77-32, filed 12/30/77. Later promulgation, see chapter 296-125 WAC.
- 296-128-465 Telephone and telegraph industry—Women and minors. [Industrial Welfare Order 12-63, filed 11/25/64; Minimum Wage and Welfare Order 53, filed 3/23/60.] Repealed by Order 77-32, filed 12/30/77. Later promulgation, see chapter 296-125 WAC.
- 296-128-470 Theatrical amusement and recreation industry—Women and minors. [Industrial Welfare Order 7-62, filed 11/25/64; Minimum Wage Order 45, filed 3/23/60.] Repealed by Order 77-32, filed 12/30/77. Later promulgation, see chapter 296-125 WAC.

RECORDKEEPING PROVISIONS

WAC 296-128-010 Records required. For all employees who are subject to RCW 49.46.020, employers shall be required to keep and preserve payroll or other records containing the following information and data with respect to each and every employee to whom said section of said act applies:

(1) Name in full, and on the same record, the employee's identifying symbol or number if such is used in place of name on any time, work, or payroll records. This shall be the same name as that used for Social Security record purposes;

(2) Home address;

(3) Occupation in which employed;

(4) Date of birth if under 18;

(5) Time of day and day of week on which the employee's workweek begins. If the employee is part of a workforce or employed in or by an establishment all of whose workers have a workweek beginning at the same time on the same day, a single notation of the time of the day and beginning day of the workweek for the whole workforce or establishment will suffice. If, however, any employee or group of employees has a workweek beginning and ending at a different time, a separate notation shall then be kept for that employee or group of employees;

(6) Hours worked each workday and total hours worked each workweek (for purposes of this section, a "workday" shall be any consecutive 24 hours);

(7) Total daily or weekly straight-time earnings or wages; that is, the total earnings or wages due for hours worked during the workday or workweek, including all earnings or wages due during any overtime worked, but exclusive of overtime excess compensation;

(8) Total overtime excess compensation for the workweek; that is, the excess compensation for overtime worked which amount is over and above all straight-time earnings or wages also earned during overtime worked;

(9) Total additions to or deductions from wages paid each pay period. Every employer making additions to or deductions from wages shall also maintain a record of the dates, amounts, and nature of the items which make up the total additions and deductions;

(10) Total wages paid each pay period;

(11) Date of payment and the pay period covered by payment;

(12) Employer may use symbols where names or figures are called for so long as such symbols are uniform and defined.

[Regulation 294.7.001 (part), filed 12/30/60.]

WAC 296-128-011 Special recordkeeping requirements. (1) In addition to the records required by WAC 296-128-010, employers who employ individuals as truck or bus drivers subject to the provisions of the Federal Motor Carrier Act shall maintain records indicating the base rate of pay, the overtime rate of pay, the hours worked by each employee for each type of work, and the formulas and projected work hours used to substantiate any deviation from payment on an hourly basis pursuant to WAC 296-128-012. The records shall indicate the period of time for which the base rate of pay and the overtime rate of pay are in effect.

For the purposes of this section and WAC 296-128-012, "base rate of pay" means the amount of compensation paid per hour or per unit of work in a workweek of forty hours or less. A base rate of pay shall be established in advance of the work performed and may be based on hours or work units such as mileage, performance of specified duties, or a specified percentage of the gross proceeds charged for specified work. A base rate of pay shall not be established that will result in compensation at less than the minimum wage prescribed in RCW 49.46.020. "Overtime rate of pay" means the amount of compensation paid for hours worked within the state of Washington in excess of forty hours per week and shall be at least one and one-half times the base rate of pay.

(2) The records required by this section shall be made available by the employer at the request of the department. Any current or past employee may obtain copies of the formula, the base rate of pay, the overtime rate of pay, and that employee's records. Job applicants seeking employment by the employer as truck or bus drivers subject to the provisions of the Federal Motor Carrier Act, may obtain copies of the formula, the base rate of pay, and the overtime rate of pay.

[Statutory Authority: RCW 43.22.270, 49.46.130 and 1989 c 104. 89-22-120, § 296-128-011, filed 11/1/89, effective 12/2/89.]

WAC 296-128-012 Overtime for truck and bus drivers. (1)(a) The compensation system under which a truck or bus driver subject to the provisions of the Federal Motor Carrier Act is paid shall include overtime pay at least reasonably equivalent to that required by RCW 49.46.130 for working within the state of Washington in excess of forty hours a week. To meet this requirement, an employer may, with notice to a truck or bus driver subject to the provisions of the Federal Motor Carrier Act, establish a rate of pay that is not on an hourly basis and that includes in the rate of pay compensation for overtime. An employer shall substantiate any deviation from payment on an hourly basis to the satisfaction of the department by using the following formula or an alternative formula that, at a minimum, compensates hours worked within the state of Washington in excess of forty hours per week at an overtime rate of pay and distributes the projected overtime pay over the average number of hours projected to be worked. The following formula is recommended for establishing a uniform rate of pay to compensate work that is not paid on an hourly basis and for which compensation for overtime is included:

1. Define work unit first. E.g., miles, loading, unloading, other.

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2.	Average number of work units	= Average number of work units accomplished per week
	per hour	Average number of hours projected to be worked per week
3.	Weekly Base Rate	= Number of units per hour x 40 hours x base rate of pay
4.	Weekly Overtime rate	= Number of units per hour x number of hours over 40 x overtime rate of pay
5.	Total weekly pay	= Weekly base rate plus weekly overtime rate
6.	Uniform rate of pay	= $\frac{\text{Total weekly pay}}{\text{Total work units}}$

Example: A truck driver is paid on a mileage basis for a two hundred thirty mile trip performed about ten times a week. The base rate of pay is twenty cents a mile. The overtime rate of pay is thirty cents a mile. The average length of the trip is four and one-half hours.

1. $\frac{2300 \text{ mi.}}{\text{per week}}$, divided by $\frac{45 \text{ hours}}{\text{per week}} = \frac{51.1 \text{ miles}}{\text{per hour}}$
2. (a) 51.1 miles/hour times 40 hours times .20/ mile = \$408.80
(b) 51.1 miles/hour times 5 hours = 255.5 miles
(c) 255.5 miles times .30/mile = \$76.65
(d) \$408.80 plus \$76.65 = \$485.45 divided by 2300 miles = 21.1 cents mile

(b) In using a formula to determine a rate of pay, the average number of hours projected to be worked and the average number of work units accomplished per week shall reflect the actual number of hours worked and work units projected to be accomplished by persons performing the same type of work over a representative time period within the past two years consisting of at least twenty-six consecutive weeks.

(c) The department may evaluate alternative rates of pay and formulas used by employers in order to determine whether the rates of pay established under this section result in the driver receiving compensation reasonably equivalent to one and one-half times the base rate of pay for actual hours worked within the state of Washington in excess of forty hours per week.

(2) Where an employee receives a different base rate of pay depending on the type of work performed, the rate that is paid or used for hours worked within the state of Washington in excess of forty hours per week shall be at least the overtime rate of pay for the type of work in which most hours were worked.

[Statutory Authority: RCW 43.22.270, 49.46.130 and 1989 c 104. 89-22-120, § 296-128-012, filed 11/1/89, effective 12/2/89.]

WAC 296-128-015 Definitions of workday and workweek. (1) A workweek is a fixed and regularly recurring period of 168 hours or seven consecutive 24 hour periods. It may begin on any day of the week and any hour of the day, and need not coincide with a calendar week.

(2) A workday is a fixed and regularly recurring period of 24 hours. It may begin at any hour of a calendar day and must begin at the same time each calendar day.

[Regulation 294.7.001 (part), filed 12/30/60.]

WAC 296-128-020 Term for keeping records. Unless otherwise specifically authorized by the director all records required under WAC 296-128-010 shall be kept for a period of at least three years.

[Regulation 294.7.001 (part), filed 12/30/60.]

WAC 296-128-025 Place for keeping records and availability for inspection. Each employer shall keep the records required by this regulation safe and accessible at the place or places of employment or at one or more established central recordkeeping offices where such records are customarily maintained. All such records shall be open at any time to inspection and transcription or copying by the director and his duly authorized representative and to the employee, upon request for that employee's work record, at any reasonable time.

[Statutory Authority: RCW 43.22.270, 49.12.020, 49.12.091, 49.12.050, 49.46.020 and 49.46.070. 89-22-016 (Order 89-16), § 296-128-025, filed 10/24/89, effective 11/24/89; Regulation 294.7.001 (part), filed 12/30/60.]

WAC 296-128-030 Petitions for exceptions. (1) **Submission of petitions for relief.** Any employer or group of employers who, due to peculiar conditions under which he or they must operate, desires authority to maintain records in a manner other than required in this regulation, or to be relieved of preserving certain records for the period specified in the regulation, may submit a written petition to the director setting forth the authority desired and the reasons therefor.

(2) **Action on petitions.** If, on review of the petition and after completion of any necessary investigation supplementary thereto, the director shall find that the authority prayed for, if granted, will not hamper or interfere with enforcement of the provisions of the act or any regulation or orders issued thereunder, he may then grant such authority but limited by such conditions as he may determine are requisite, and subject to subsequent revocation. Where the authority granted hereunder is sought to be revoked for failure to comply with the conditions determined by the director to be requisite to its existence, the employer or groups of employers involved shall be notified in writing of the facts constituting such failure and afforded an opportunity to achieve or demonstrate compliance.

(3) **Compliance after submission of petitions.** The submission of a petition or the delay of the director in acting upon such petition shall not relieve any employer or group of employers from any obligations to comply with all the requirements of the regulations in this part applicable to him or them. However the director shall give notice of the denial of any petition with due promptness.

[Regulation 294.7.001 (part), filed 12/30/60.]

WAC 296-128-035 Payment interval. All wages due shall be paid at no longer than monthly intervals to each employee on established regular pay days. To facilitate bookkeeping, an employer may implement a regular payroll system in which wages from up to seven days before pay day may be withheld from the pay period covered and included in the next pay period.

(1997 Ed.)

[Statutory Authority: RCW 43.22.270, 49.12.020, 49.12.091, 49.12.050, 49.46.020 and 49.46.070. 89-22-016 (Order 89-16), § 296-128-035, filed 10/24/89, effective 11/24/89.]

HANDICAPPED WORKERS

WAC 296-128-050 Applicability of this regulation. This regulation is issued pursuant to RCW 49.46.060, Washington minimum wage and hour law, which authorized the director of the department of labor and industries, to the extent necessary in order to prevent curtailment of opportunities for employment, to issue special certificates for employment of individuals whose earning capacity is impaired by age or physical or mental deficiency or injury at wages lower than the minimum wage applicable under RCW 49.46.020. Such certificates shall be subject to the conditions prescribed in this regulation.

[§ 1, Regulation 294.6.005, filed 12/30/60.]

WAC 296-128-055 Definition. "Handicapped worker" means an individual whose earning capacity is impaired by age or physical or mental deficiency or injury for the work he is to perform.

[§ 2, Regulation 294.6.005, filed 12/30/60.]

WAC 296-128-060 Application for certificate. (1) Application for a certificate authorizing the employment of handicapped workers shall be made upon forms made available by the director or his authorized representatives.

(2) The application shall set forth, among other things, the nature of the disability, a description of the occupation at which the handicapped worker is to be employed, and the wage the employer proposes to pay the handicapped worker per hour. The nature of the disability must be set out in detail.

(3) The application shall be signed jointly by the employer and the handicapped worker for whom such application is being made, except as otherwise authorized by the director or his authorized representative.

[§ 3, Regulation 294.6.005, filed 12/30/60.]

WAC 296-128-065 Conditions for granting a certificate. (1) If the application is in proper form and sets forth facts showing:

(a) A subminimum wage is necessary to prevent curtailment of the handicapped worker's opportunities for employment;

(b) the handicap impairs the earning capacity of the worker for the work he is to perform, a certificate may be issued.

(2) The director or his authorized representative may require the submission of additional information to that shown on the application and may require the handicapped worker to take a medical examination where it is deemed necessary in order to determine whether or not the issuance of a certificate is justified.

[§ 4, Regulation 294.6.005, filed 12/30/60.]

WAC 296-128-070 Issuance of certificate. If the application and other available information indicate that the

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requirements of this regulation are satisfied, the director or his authorized representative shall issue a certificate. Otherwise he shall deny a certificate. If issued, copies of the certificate shall be mailed to the employer and the handicapped worker and if denied, the employer and the handicapped worker shall be given written notice of the denial.

[§ 5, Regulation 294.6.005, filed 12/30/60.]

WAC 296-128-075 Terms of certificate. (1) A certificate shall specify, among other things, the name of the handicapped worker, the name of the employer, the occupation in which the handicapped worker is to be employed, the authorized subminimum wage rate and the period of time during which such wage rate may be paid.

(2) A certificate shall be effective for a period to be designated by the director or his authorized representative and a handicapped worker employed under such certificate may be paid subminimum wages only during the effective period of the certificate.

(3) The wage rate set in the certificate shall be fixed at a figure designed to reflect adequately the handicapped worker's earning capacity. No wage rate shall be fixed at less than 75 percent of the applicable minimum wage under RCW 49.46.020 unless, after investigation a lower rate appears to be clearly justified.

(4) Any money received by a handicapped worker by reason of any state or federal pension or compensation program for handicapped persons shall not be considered as offsetting any part of the wage or remuneration due the handicapped worker by the employer.

(5) The worker or trainee shall be paid not less than one and one-half times the regular rate for hours worked in excess of 40 in the workweek or 8 in the workday.

(6) The terms of any certificate, including the subminimum wage rate specified therein, may be amended by the director or his authorized representative upon written notice to the parties concerned, if the facts justify such amendment.

[§ 6, Regulation 294.6.005, filed 12/30/60.]

WAC 296-128-080 Renewal of certificate. Application for renewal of any certificate shall be filed in the same manner as an original application. If such application has been filed prior to the expiration date of the certificate, the certificate shall remain in effect until the application for renewal has been granted or denied.

[§ 7, Regulation 294.6.005, filed 12/30/60.]

WAC 296-128-085 Review. Any person aggrieved by any action of the director or his authorized representative taken pursuant to this regulation may, within 15 days after notice of such action has been mailed, file with the director a petition for review of the action complained of, setting forth grounds for seeking such review. If reasonable grounds exist, the director or his authorized representative may grant such review and to the extent deemed appropriate afford all interested persons an opportunity to be heard on such review.

[§ 8, Regulation 294.6.005, filed 12/30/60.]

WAC 296-128-090 Amendment of this regulation. Any person desiring revision of any of the terms of this regulation may submit in writing to the director a petition setting forth the changes desired and the reasons for proposing them. If the director believes that reasonable cause for amendment of this regulation is set forth he will schedule a hearing in accordance with RCW 49.46.080.

[§ 9, Regulation 294.6.005, filed 12/30/60.]

EMPLOYMENT OF LEARNERS

WAC 296-128-100 Authority. This regulation is promulgated in accordance with RCW 49.46.060.

[§ 1, Regulation 294.6.003, filed 3/23/60.]

WAC 296-128-105 Definitions. As used in this regulation:

(1) A "learner" is a worker whose total experience in an authorized learner occupation is less than the period of time allowed as a learning period for that occupation in a learner certificate issued pursuant to these regulations.

(2) An "experienced worker" is a worker whose total experience in an authorized learner occupation is at least equal to the period of time allowed as a learning period for that occupation in a learner certificate issued pursuant to these regulations.

(3) "Experienced worker available for employment" means an experienced worker residing within the area from which the employer customarily draws its labor supply or within a reasonable commuting distance of such area, and who is willing and able to accept employment with the employer; or an experienced worker residing outside of the area from which the employer customarily draws its labor supply, who has in fact made himself available for employment.

[§ 2, Regulation 294.6.003, filed 3/23/60.]

WAC 296-128-110 Application for learner certificate. (1) Whenever the employment of learners at wages lower than the minimum wage applicable under RCW 49.46.020 is believed necessary to prevent curtailment of opportunities for employment by a specified employer, an application for a certificate authorizing the employment of such learners at subminimum wage rates may be filed by the employer with the director of the department of labor and industries or his authorized representative.

(2) Application must be made on the official form provided by the department and furnish all information called for on said form.

(3) Separate application must be made with respect to each establishment or place of business operated by the applicant and in which he desires to employ learners at subminimum wage rates.

[§ 3, Regulation 294.6.003, filed 3/23/60.]

WAC 296-128-115 Procedure for action upon an application. (1) Upon receipt of an application for a learner certificate or renewal of such certificate the director or his authorized representative shall consider all relevant facts and,

subject to the conditions specified in WAC 296-128-120, shall issue or deny a learner certificate or, in appropriate circumstances, provide an opportunity to interested parties to present their views on the application prior to granting or denying a learner certificate.

(2) If a learner certificate is granted, notice of such fact and the terms of the certificate shall be posted at the employer's place of business for 15 days after receipt thereof and any interested person may file with the director written requests for reconsideration or review. Such application should set forth the applicant's interest in the review and the reasons he seeks review.

(3) If a learner certificate is denied, notice of such denial shall be mailed to the employer and it shall be without prejudice to the subsequent filing of an application.

[§ 4, Regulation 294.6.003, filed 3/23/60.]

WAC 296-128-120 Conditions governing issuance of learner certificates. The following conditions shall govern the issuance of a special certificate authorizing the employment of learners at subminimum wage rates:

(1) An adequate supply of qualified experienced workers is not available for employment; the experienced workers presently employed in occupations in which learners are requested, are afforded an opportunity for full time employment; learners are available for employment; and the granting of a certificate is necessary to prevent curtailment of employment opportunities.

(2) Reasonable efforts have been made to obtain experienced workers, including the placement of an order with the employment security office of the state of Washington.

(3) The issuance of a learner certificate will not tend to create unfair competitive labor cost advantages nor have the effect of impairing or depressing wage or working standards established for experienced workers for work of a like or comparable character in the industry.

(4) Abnormal labor conditions such as a strike, lock-out or other similar condition do not exist at the place of business for which a learner certificate is requested.

(5) There are no serious outstanding violations of the provisions of learner certificates previously issued to the employer, nor have there been any serious violations of the Washington Minimum Wage and Hour Act which provide reasonable grounds to believe that the terms of a certificate may not be complied with.

(6) The occupation or occupations in which learners are to receive training require a sufficient degree of skill to necessitate an appreciable training period.

(7) Learners shall be afforded every reasonable opportunity for continued employment upon completion of the learning period.

(8) Unless otherwise specified in the learner certificate, a learning program shall not exceed 480 hours of employment, and the total hours worked in any establishment by learners shall not exceed 10 percent of the total hours normally worked by experienced workers in such establishment: *Provided*, That where less than 10 experienced workers are employed by an employer, a learner certificate may authorize the employment of learners for a maximum of 40 hours per week under a bona fide learner program.

[§ 5, Regulation 294.6.003, filed 3/23/60.]

WAC 296-128-125 Terms and conditions of employment under learner certificates. (1) A learner certificate, if issued, shall specify, among other things:

(a) The number or proportion of learners authorized to be employed on any one day;

(b) The occupations in which learners may be employed;

(c) The subminimum wage rates permitted for each learner occupation during the authorized learning period; which shall not be less than 85 percent of the minimum wage specified in RCW 49.46.020, as it may be amended, unless otherwise specified in the certificate;

(d) The learning period for each authorized learner occupation;

(e) The effective and expiration dates of the certificate.

(2) A learner certificate may be issued for a period of not longer than one year. A renewal certificate will not be issued without a clear showing that conditions set forth in WAC 296-128-120 still prevail.

(3) Learners hired pursuant to a learner certificate prior to the date on which such certificate expires may be continued in employment at the authorized subminimum wage rate for the duration of their authorized learning period even though the certificate expired before the learning period is completed.

(4) A copy of the learner certificate shall be posted by the employer during its effective period in a conspicuous place in the department where learners are to be employed.

(5) No learner shall be hired under a learner certificate if, at the time the employment begins, experienced workers capable of equaling the performance of a worker of minimum acceptable skill are available for employment.

(6) No learner shall be hired under a learner certificate while abnormal labor conditions exist such as a strike, lock-out, or other similar conditions in the place of business for which a learner certificate has been issued.

(7) The number of hours of previous employment in a learner occupation for which the learner has been hired must be deducted from the authorized learning period if within the three years immediately preceding the hiring of such learner he has been employed in the learner occupation for less than the total number of hours authorized as a learning period and shall also be deducted from the authorized learning period all hours spent in pertinent training in a vocational training school on the occupation for which the learner has been employed.

(8) No provision of any learner certificate will excuse noncompliance with higher standards applicable to learners which may be established under any other state law, federal law, or trade union agreement.

(9) Unless otherwise specified in the learner certificate a learning program shall not exceed 480 hours of employment and the total hours worked in any establishment by learners shall not exceed 10 percent of the total hours normally worked by experienced workers in such establishment: *Provided*, That where less than 10 experienced workers are employed by an employer a learner certificate may authorize the employment of learners for a maximum of 40 hours per week under a bona fide learner program.

[§ 6, Regulation 294.6.003, filed 3/23/60.]

WAC 296-128-130 Records to be kept by employers of learners. The director or his authorized representative may specify additional records to be kept by employers of learners as a condition to compliance with the learner certificate.

[§ 7, Regulation 294.6.003, filed 3/23/60.]

WAC 296-128-135 Amendment and revocation of learner certificate. The director may amend or revoke a learner certificate when it is necessary by reason of changes in these regulations, or where the employer has violated its terms, or where the certificate was obtained by misleading or false statements, or where changed conditions warrant it in the opinion of the director.

[§ 8, Regulation 294.6.003, filed 3/23/60.]

WAC 296-128-140 Supplemental regulations. (1) Upon application of any person or persons, representing any industry or branch thereof, or upon his own motion, the director, if he deems it advisable, may, after appropriate and timely notice to interested parties, cause a hearing to be held to determine the need for employment of learners at wages lower than the minimum wage applicable under RCW 49.46.020 in order to prevent curtailment of employment opportunities in any industry or branch thereof; and if such need is found to exist, determine the occupations which require a learning period and the limitations as to wages, time, number, proportion, and length of learning period. Such hearing shall be held before the director or his duly authorized representative. Following such hearing the director may, by supplemental regulations, prescribe the conditions under which special certificates shall be issued for the employment of learners in such industry or branch thereof, if he finds that there is a need therefor to prevent curtailment of opportunities for employment.

(2) At such hearing the director may cause to be brought before him or his authorized representative any witness whose testimony he deems material to the subject matter before him.

[§ 9, Regulation 294.6.003, filed 3/23/60.]

WAC 296-128-145 Reconsideration and review. (1) Any person aggrieved by the action of the director or his authorized representative denying or granting a learner certificate may within 15 days after mailing of notice of such action file a written request for reconsideration with the director.

(2) A request for a reconsideration shall be accompanied by a statement of the additional evidence which the applicant believes may materially affect the decision.

(3) A request for review shall be granted where reasonable grounds are set forth in the request and if such review is granted all interested persons shall be afforded an opportunity to be heard.

[§ 10, Regulation 294.6.003, filed 3/23/60.]

WAC 296-128-150 Procedure for amendment. The director may at any time upon his own motion or upon

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written request of any interested persons setting forth reasonable grounds therefor amend or revoke any of the terms of this regulation or of any supplemental regulations promulgated in accordance with WAC 296-128-140 after hearing as provided in RCW 49.46.080.

[§ 11, Regulation 294.6.003, filed 3/23/60.]

STUDENT LEARNERS

WAC 296-128-175 Applicability of the regulation. This regulation is issued in accordance with RCW 49.46.060, to provide for the employment under special certificates of student learners at wages less than the minimum provided in RCW 49.46.020, in order to prevent curtailment of opportunities for employment. Such certificates shall be subject to the terms and conditions hereinafter set forth.

[§ 1, Regulation 294.6.004, filed 3/23/60.]

WAC 296-128-180 Definitions. (1) A "student learner" is a student who is receiving instruction in an accredited school, college, or university, and who is employed on a part-time basis in a bona fide vocational training program, or in a job-training program established by an accredited school and approved by the director of the department of labor and industries.

(2) A "bona fide vocational training program" is one authorized and approved by the state board of vocational education and provides for part-time employment which may be scheduled for part of the workday or workweek, for alternating weeks or for other limited periods during the year, supplemented by and integrated with a definitely organized plan of instruction designed to teach technical knowledge or related industrial information given as a regular part of the student learner's course by an accredited school, college, or university.

[§ 2, Regulation 294.6.004, filed 3/23/60.]

WAC 296-128-185 Application for certificate. (1) Whenever the employment of a student learner at wages lower than the minimum wage applicable under RCW 49.46.020 is believed necessary to prevent curtailment of opportunities for employment, an application for a special certificate authorizing the employment of such student learner at subminimum wages shall be filed by the employer with the director of the department of labor and industries or his authorized representative.

(2) Application shall be on forms furnished by the department of labor and industries and must be signed by the employer, an appropriate school official and the student learner. Such application shall, among other things, show: The nature of the training program; the total number of workers employed by the employer; the number and hourly wage rate of experienced workers employed in the occupation in which the student learner is to be trained; the hourly wage rate or progressive wage schedule which the employer proposes to pay the student learner; the age of the student learner; the period of employment training at subminimum wages; the number of hours of employment training a week; the number of hours of school instruction a week.

[§ 3, Regulation 294.6.004, filed 3/23/60.]

WAC 296-128-190 Procedure for action upon application. (1) Upon receipt of application for the employment of a student learner the director or his authorized representative shall either issue a special certificate or deny the application. To the extent deemed necessary the director or his authorized representative may provide an opportunity to interested persons to be heard on the application prior to granting or denying it.

(2) If a special certificate is issued it shall be mailed to the employer and a copy of it shall be mailed to the school official who signs the application.

[§ 4, Regulation 294.6.004, filed 3/23/60.]

WAC 296-128-195 Conditions governing issuance of special student learner certificate. The following conditions must be satisfied before a special certificate may be issued authorizing employment of student learners at subminimum wages:

(1) Any training program under which the student learner will be employed must be a bona fide vocational training program as defined in WAC 296-128-180 or be a part of a job-training program established by the governing body of the school and approved by the director of the department of labor and industries.

(2) The employment of the student learner at subminimum wages must be necessary to prevent curtailment of opportunities for employment.

(3) The occupation for which the student learner is receiving preparatory training must require a sufficient degree of skill to necessitate a substantial learning period.

(4) The employment of a student learner must not have the effect of displacing a worker employed in the establishment in which the student learner is to be employed.

(5) The employment of the student learner at subminimum wages must not tend to impair or depress the wage rates or working standards established for experienced workers for work of a like or comparable nature.

(6) The issuance of such a certificate must not tend to prevent the development of apprenticeships or must not impair established apprenticeship standards in the occupation or industry involved.

[§ 5, Regulation 294.6.004, filed 3/23/60.]

WAC 296-128-200 Terms and conditions of special student learner certificate. (1) The special student learner certificate if issued shall specify among other things: (a) The name of the student learner; (b) the name and address of the employer; (c) the name of the school which provides the related school instruction; (d) the occupation in which the student is to be trained; (e) the maximum number of hours of employment training in any one week at a specified subminimum wage rate; (f) the number of hours per week in which the student is engaged in his school training program; (g) the effective and expiration dates of the certificate.

(2) The subminimum wage rate shall be not less than 75 percent of the minimum wage provided in RCW 49.46.020.

(3) Unless otherwise authorized by the director or his authorized representative the number of hours of employment training each week at subminimum wages pursuant to certificate, when added to the hours of school instruction shall not exceed 40 hours: *Provided, however,* That when

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school is not in session on any school day or school week, the student learner may work a number of hours in addition to the weekly number of hours of employment training authorized by the certificate, provided that the hours do not exceed 8 in such day or 40 in such week.

(4) Unless otherwise authorized by the director or his authorized representative the total number of hours worked by all student learners employed by an employer shall not exceed 10 percent of the total hours worked by all regular employees of said employer in the establishment in which such student learners are employed.

[§ 6, Regulation 294.6.004, filed 3/23/60.]

WAC 296-128-205 Term of special certificate. A special student learner certificate may be issued for a period not to exceed the length of one school year unless the director finds that a longer period is justified by extraordinary circumstances.

[§ 7, Regulation 294.6.004, filed 3/23/60.]

WAC 296-128-210 Review. Any person aggrieved by the action of the director or his authorized representative in denying or granting a special student learner certificate may within 15 days after the mailing of notice of such action file a written request for review which will be granted where such request sets forth reasonable grounds therefor. To the extent the director or his authorized representative deems it necessary he shall afford all persons interested in said review an opportunity to be heard.

[§ 8, Regulation 294.6.004, filed 3/23/60.]

WAC 296-128-215 Amendment of this regulation. Any person desiring revision of any of the terms of this regulation may submit in writing to the director a petition setting forth the changes desired and the reasons for proposing them. If the director believes that reasonable cause for amendment of this regulation is set forth he will schedule a hearing in accordance with RCW 49.46.080.

[§ 9, Regulation 294.6.004, filed 3/23/60.]

APPRENTICES

WAC 296-128-225 Employment of apprentices at subminimum wages. The director or his authorized representative, to the extent necessary to prevent curtailment of employment opportunities, shall issue special certificates to employers or apprenticeship committees as defined in RCW 49.04.040 authorizing the employment of apprentices in skilled trades at wages lower than the minimum wage applicable under RCW 49.46.020, subject to the limitations and conditions set forth in this regulation.

[§ 1, Regulation 294.6.002, filed 12/30/60.]

WAC 296-128-230 Definition of apprentice. The term "apprentice" shall mean a person at least 16 years of age who is covered by a written agreement registered with the Washington state apprenticeship council providing for not less than 4,000 hours of reasonably continuous employment for such person, and for his participation in an ap-

proved schedule of work experience through employment which should be supplemented by 144 hours per year of related technical instruction.

[§ 2, Regulation 294.6.002, filed 12/30/60.]

WAC 296-128-235 Registration of apprenticeship agreement. Before an apprentice may be employed at subminimum wages, the employer or apprenticeship committee shall have submitted an apprenticeship agreement for registration with the director of apprenticeship or the apprenticeship council of the department of labor and industries.

[§ 3, Regulation 294.6.002, filed 12/30/60.]

WAC 296-128-240 Procedure for issuing certificates authorizing employment of apprentices at subminimum wages. (1) Upon being informed by the director of apprenticeship that such apprenticeship agreement has been accepted for registration in accordance with RCW 49.04.030, and that such agreement calls for employment of apprentices at subminimum wages, the director, or his authorized representative, may issue a special certificate in accordance with WAC 296-128-225. Otherwise, he shall deny the special certificate.

(2) The special certificate, if issued, shall be mailed to the employer or apprenticeship committee and a copy shall be mailed to the apprentice. If the certificate is denied, the employer or apprenticeship committee will be so notified by mail.

(3) A special certificate will not be issued where there are serious outstanding violations involving an employer for whom a special certificate is being requested, or where there are any serious outstanding violations of a certificate previously issued, or where there have been any serious violations of the act which provide reasonable grounds to conclude that the terms of a certificate may not be complied with, if issued.

[§ 4, Regulation 294.6.002, filed 12/30/60.]

WAC 296-128-245 Terms of special certificate. (1) Each special certificate shall specify the conditions and limitations under which it is granted, including the name of the apprentice, the skilled trade in which he is to be employed, the subminimum wage rates and the periods of time during which such wage rates may be paid.

(2) The terms of any special certificate, including the wages specified therein may be amended for cause.

[§ 5, Regulation 294.6.002, filed 12/30/60.]

WAC 296-128-250 Hearing procedure. The director or his authorized representative may conduct an investigation, which may include a hearing, prior to issuing or denying an application for special certificate. To the extent he deems appropriate, the director, or his authorized representative, may provide an opportunity for other interested persons to be heard prior to granting or denying an apprentice certificate.

[§ 6, Regulation 294.6.002, filed 12/30/60.]

EMPLOYMENT OF STUDENT WORKERS

WAC 296-128-275 Applicability. The regulations hereinafter set forth are issued pursuant to RCW 49.46.060 to provide for the employment by educational institutions under special certificates of student workers as learners at wages lower than the minimum wage applicable under RCW 49.46.020. Such certificates shall be subject to the terms and conditions hereinafter set forth.

[§ 1, Regulation 294.6.001, filed 3/23/60.]

WAC 296-128-280 Definitions. As used in the regulations:

(1) A "student worker" is a student who is receiving instruction in a bona fide educational program in an educational institution and who is employed on a part-time basis by the educational institution from which the student is receiving his instruction, for the purpose of enabling the student to defray part of his school expenses.

(2) "Department" means department of labor and industries.

(3) "Director" means director of department of labor and industries.

(4) "Supervisor" means supervisor of wage and hour division of the department of labor and industries.

[§ 2, Regulation 294.6.001, filed 3/23/60.]

WAC 296-128-285 Filing applications. Whenever the employment of student workers as learners at wages lower than the minimum wage applicable under RCW 49.46.020 is believed necessary to prevent curtailment of opportunities for employment in a specified educational institution, applications for special certificates authorizing the employment of such student workers as learners at subminimum wage rates may be filed by an appropriate official of the educational institution with the director, supervisor, or duly authorized representative of the wage and hour division of the department of labor and industries on official forms furnished by the department.

[§ 3, Regulation 294.6.001, filed 3/23/60.]

WAC 296-128-290 Issuing or denying certificates. Upon receipt of an application for the employment of student workers as learners, the director or his authorized representative shall issue or deny a special certificate authorizing employment of student workers. To the extent he deems appropriate, the director or his authorized representative may provide an opportunity to other interested persons to present data and views on the application prior to granting or denying a student worker certificate. If a student worker certificate is granted, it shall be mailed to the educational institution. If a student worker certificate is denied, notice of such denial shall be mailed to the educational institution and such denial shall be without prejudice to the filing of any subsequent application.

[§ 4, Regulation 294.6.001, filed 3/23/60.]

WAC 296-128-295 Conditions governing issuance of certificates. The following conditions shall govern the

issuance of a special certificate authorizing the employment of student workers as learners by an educational institution at subminimum wage rates:

(1) The employment of the student workers at subminimum wages authorized by the certificate must be necessary to prevent curtailment of opportunities for employment in a specified educational institution.

(2) The issuance of the student worker certificate will not tend to create unfair competitive labor cost advantages nor have the effect of impairing or depressing wage or working standards established for experienced workers for work of a like or comparable character in the industry or community.

(3) The occupations to be filled by the student workers shall not be in the production of goods or services which would be sold in competition with privately owned businesses, nor in enterprises operated by the educational institution in competition with privately owned businesses.

(4) There have been no serious outstanding violations of the provisions of a student workers certificate previously issued to the educational institution, nor have there been any serious violations of the act which provide reasonable grounds to conclude that the terms of a student worker certificate may not be complied with, if issued.

[§ 5, Regulation 294.6.001, filed 3/23/60.]

WAC 296-128-300 Data required on certificate.

The student worker certificate, if issued, shall specify, among other things:

(1) The name and address of the educational institution employing the student workers;

(2) The occupations in which the student workers are employed;

(3) The number of student workers to be employed in any one day;

(4) The authorized subminimum wage rate to be paid for each occupation;

(5) The effective and expiration dates of the certificate.

[§ 6, Regulation 294.6.001, filed 3/23/60.]

WAC 296-128-305 Wage rate. The subminimum wage rate shall be not less than 75 percent of the minimum wage rate established by RCW 49.46.020, as it may be amended.

[§ 7, Regulation 294.6.001, filed 3/23/60.]

WAC 296-128-310 Records. In addition to any other records required by reason of the Washington Minimum Wage and Hour Act, the educational institution shall keep and maintain the following records specifically relating to student workers employed at subminimum wage rates:

(1) Each student worker employed under a student worker certificate shall be designated as such on the payroll records kept by the institution, with each student worker's occupation and rate of pay being shown.

(2) The records required including a copy of any special certificate issued, shall be kept and made available for inspection at all times for at least three years from the effective date of the certificate.

[§ 8, Regulation 294.6.001, filed 3/23/60.]

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WAC 296-128-315 Amending and revoking certificates. The director of the department of labor and industries or his authorized representative may amend the provisions of a student worker certificate or he may revoke such certificate where it is shown to his satisfaction that its provisions have not been complied with.

[§ 9, Regulation 294.6.001, filed 3/23/60.]

WAC 296-128-400 Minors. (1) Applicability of order. This order shall apply to all minors employed in any industry or establishment in the state of Washington who are not expressly covered by another minimum wage and welfare order issued by the industrial welfare committee, except: Minors employed:

(a) By common carrier railroads, sleeping car companies and freight or express companies subject to regulations of federal law.

(b) In agricultural labor.

(c) In domestic work or chores performed in or about private residences.

(d) In a vocational education, work experience or apprentice training program, when such program is properly supervised by school personnel or in accordance with written agreements and approved training schedules.

(e) Directly by a telephone or telegraph company. This order shall not apply to newspaper vendors and newspaper carriers.

(2) Definitions. For the purpose of this order:

(a) A "minor" is a person of either sex under the age of eighteen years.

(b) The term "employee" shall mean any minor who is employed to work in any industry or establishment in the state of Washington other than those expressly excluded by the foregoing paragraphs.

(c) The term "employer" shall mean any person, association, corporation, co-partnership, or municipal corporation, engaged in any industry or establishment covered by this order and who (or which) employs any minor covered by this order.

(d) The term "agricultural labor" shall mean employment.

(i) On a farm, in the employ of any person in connection with the cultivating of the soil, or in connection with raising or harvesting any agricultural or horticultural commodity, including raising, shearing, feeding, caring for, training and management of livestock, bees, poultry, and furbearing animals and wildlife, or in the employ of the owner or tenant or other operator of a farm in connection with the operation, management, conservation, improvement, or maintenance of such farm and its tools and equipment; or

(ii) In handling, planting, packing, packaging, grading, storing, or delivering to storage or to a market or to a carrier for transportation to market, any agricultural or horticultural commodity; but only if such service is performed as an incident to ordinary farming operations, or, in the case of fruits and vegetables in their raw and natural state, as an incident to the preparation of such fruits and vegetables for market. The provisions of this paragraph shall not be deemed to be applicable with respect to services performed in connection with commercial canning or commercial freezing or any other commercial processing which changes

the character of the product from its raw and natural state or in connection with any agricultural or horticultural commodity after its delivery to a terminal market for distribution for consumption.

(3) Minimum wages.

(a) Minimum wages for all minors covered by this order, in the state of Washington shall be fifty cents per hour, regardless of the manner in which they are computed, except when another order (or orders) issued by the industrial welfare committee of the state of Washington provides a different minimum.

(b) Whenever the administrator of the wage and hour division of the United States department of labor shall issue a certificate or certificates permitting the employment of learners, apprentices, messengers, and handicapped workers, at wage rates below the minimums herein fixed, the payment of wages in accordance with such permits shall not constitute a violation of this order.

(4) Hours.

(a) No minor shall be employed more than five hours without a meal period, on the employee's time, of at least thirty minutes.

(b) There shall be a rest period on the employer's time of ten minutes in every four-hour period of employment.

(c) Minors 14 and 15 years of age shall not be employed more than eight hours in any one day or six days in any one week. In computing the hours, one-half the total attendance hours in school shall be included. When school is not in session said minors shall not be employed more than forty hours in any one week.

(d) Minors 16 and 17 years of age shall not be employed more than eight hours in any one day or six days in any one week except in seasonal industries or in cases of emergency.

(e) Minors 14 and 15 years of age shall not be permitted to work after the hours of 7:00 p.m. or before 6 a.m. (pacific standard time), unless such employment is specifically authorized by the terms of this order, or by a permit specifically authorizing such employment issued by the industrial welfare committee of the state department of labor and industries, or its duly designated agent for the issuance of such permit.

(f) Minor boys 14 and 15 years of age may be issued permits to work in approved amusement industries not more than six days a week and not later than 7:00 p.m. (pacific standard time).

(g) Minors 16 and 17 years of age attending school may be employed after 7:00 p.m. (pacific standard time) for such hours not exceeding eight hours in any one day, and in such employments, as shall be specifically authorized in the individual permits issued to each minor, when upon investigation by the supervisor of women and minors in industry the conditions of employment are found not detrimental to the welfare of the minors or their school program. Such permits shall not be issued to girls unless satisfactory assurance is given the industrial welfare committee of the state department of labor and industries or its authorized agent that such minors are to be safely conveyed to their homes.

(5) Work permits and proof of age certificates.

(a) No minor shall be employed in any occupation covered by this order unless the employer has on file during

the period of employment an unexpired work certificate or permit issued by the industrial welfare committee of the state department of labor and industries or its duly designated agent for the issuance of such permit. Such permit will not be issued except upon presentation of such evidence of age as is required by the industrial welfare committee.

(b) The issuance of a certificate or permit to work shall not authorize or excuse a violation of the state of Washington compulsory school attendance law, and shall not be issued to any minor legally required to attend school when school is in session except with the approval of the school authorities.

(6) Employment prohibited to all minors.

(a) No minor shall be employed in any occupation which the state department of labor and industries, through its industrial welfare committee, shall upon due notice and hearing find and by order declare to be particularly hazardous for the employment of minors under the ages specified in such order as detrimental to their health or morals.

(b) No minor shall be permitted to work in any of the following occupations:

(i) In any place where intoxicating liquor is served in the same room.

(ii) As driver or helper on state licensed motor vehicles in traffic congested areas.

(iii) In operating, tending or in dangerous proximity to dangerous power driven machinery.

(iv) In connection with the commercial operation of a 35 millimeter projection machine in a motion picture theatre or public building.

(v) To give signals to engineers in logging operations, or to receive and forward signals.

(vi) As an engineer, or within dangerous proximity to any cables, rigging or hazardous machinery.

(7) Employment prohibited to all minor girls. No minor girl shall be employed as:

(a) A shaker in a laundry, except on hand towels, handkerchiefs, napkins and similar small articles.

(b) In or in connection with a barber shop.

(c) A canvasser or peddler from house to house.

(d) An elevator operator.

(e) A clerk selling cigars or tobacco.

(f) A hotel messenger.

(g) A cabaret performer.

(h) In shooting galleries, penny arcades, bowling alleys.

(i) A public messenger (i.e., one whose services are available to the public for hire), except that girls 16 and 17 years of age will be permitted as building messengers in buildings within a radius of three blocks from one another.

(8) Employment entirely prohibited to minors under 16 years of age. Minors under sixteen years of age shall not be permitted to operate machinery in connection with processing or manufacturing plants.

(9) Employments prohibited to minors under 14 years of age. Minors under fourteen years of age shall not be employed in the following occupations unless such employment is specifically authorized by a permit issued by a judge of the superior court of the state of Washington:

(a) In stock room work in warehouses.

(b) As clerks in mercantile establishments.

(c) In offices as errand or office maintenance workers.

(d) In cafes as bus boys or dishwashers or helpers.

(e) As service station attendants.

(f) In other occupations which the industrial welfare committee, after due notice and hearing, shall have determined to be hazardous or detrimental to the welfare of the minor.

(10) **Employment of minors 14 to 18 years of age.** Minors 14 to 18 years of age may be employed in any occupation or industry except where such employment is expressly prohibited by this order or by statute of the state of Washington, provided that all the conditions and requirements of this order are complied with.

(11) **Working conditions.**

(a) All places where minors are employed shall be maintained in a safe and sanitary condition. The requirements for safety, sanitation and first aid shall be in conformity with the safety standards, rules and regulations as adopted by the division of safety of the department of labor and industries.

(b) Every room in which minors are employed shall be adequately heated and ventilated, and supplied with adequate natural or artificial light in accordance with the general safety standards of the department of labor and industries.

(c) Each such room shall be provided with a smooth, tight floor, which can be kept clean and sanitary. Where wet processes are employed, the floors must be adequately drained so that there will be no unreasonable depth of liquid at any point. Where floors are wet, wooden racks or grating of an adequate height shall be provided at such points.

(d) Toilet rooms shall be provided for women and female minors sufficiently separated and isolated to insure privacy, which rooms shall be maintained in a sanitary condition, adequately lighted, heated and ventilated. A sufficient number of wash bowls or sink space shall be located either within the toilet room or adjacent to the toilet room. Any wash bowls or sinks not so located shall be installed in an approved location. Sufficient soap and either individual or paper towels shall be provided.

(e) Employers shall provide for adequate keeping of employee's outer clothing during working hours, and for their work clothes during nonworking hours. When the occupation requires a change of clothing, a suitable space adequately heated shall be provided where employees may make such change in privacy.

(f)(i) A suitable rest room for women and female minors shall be provided, and shall be properly ventilated and heated.

(ii) An adequate cloak room shall be provided.

(iii) An adequate lunch room furnished with tables and chairs, and facilities for heating water shall be provided: *Provided, however,* That where less than ten women and female minors are regularly employed, the supervisor of women and minors in industry, upon application and showing, may permit a modified compliance with the foregoing part of this section or any part of the same.

(g) No female minor shall be required or permitted to lift or carry an excessive weight.

(h) No female minor shall be knowingly employed for a period of four weeks before confinement for pregnancy or four weeks thereafter.

(12) **Records.** Records showing the name of minors employed, dates of employment, wages paid and the hours worked by them, shall be kept by the employer and available

for inspection by the representatives of the industrial welfare committee of the state department of labor and industries at all reasonable times.

(13) **Posting of order.** The employer shall post a copy of this order in all places where minor workers are employed.

(14) **Separability.** If the application of any provision of this order, or any section, subsection, subdivision, sentence, clause, phrase, word or portion of this order shall be held invalid or unconstitutional, the remaining provisions thereof shall not be affected thereby but shall continue to be given full force and effect as if the part so held invalid or unconstitutional had not been included therein.

(15) **Penalties.** The supervisor of women and minors in industry shall investigate the complaint of any individual alleging that this order has been violated. Any person employing a minor in violation of this order shall upon conviction thereof be punished in accordance with the applicable laws of the state of Washington, RCW 49.12.170, now states as follows: "Any person employing a woman or minor for whom a minimum wage or standard conditions of labor have been specified, at less than said minimum wage, or under conditions of labor prohibited by order of the committee; or violating any other of the provisions of RCW 49.12.010 through 49.12.180, shall be deemed guilty of a misdemeanor, and shall, upon conviction thereof, be punished by a fine of not less than twenty-five dollars nor more than one hundred dollars."

[Minimum Wage and Welfare Order No. 49, filed 3/23/60.]

WAC 296-128-500 Purpose. This regulation is adopted in accordance with chapter 49.46 RCW to define the terms "bona fide executive, administrative, or professional capacity or in the capacity of outside salesman" and to establish a procedure for computing overtime pay.

[Order 76-5, § 296-128-500, filed 2/24/76.]

WAC 296-128-510 Executive. The term "individual employed in a bona fide executive . . . capacity" in RCW 49.46.010 (5)(c) shall mean any employee:

(1) Whose primary duty consists of the management of the enterprise in which he is employed or of a customarily recognized department or subdivision thereof; and

(2) Who customarily and regularly directs the work of two or more other employees therein; and

(3) Who has the authority to hire or fire other employees or whose suggestions and recommendations as to the hiring or firing and as to the advancement and promotion or any other change of status of other employees will be given particular weight; and

(4) Who customarily and regularly exercises discretionary powers; and

(5) Who does not devote more than 20 percent, or, in the case of an employee of a retail or service establishment who does not devote as much as 40 percent, of his hours worked in the work week to activities which are not directly and closely related to the performance of the work described in paragraphs (1) through (4) of this section: *Provided,* That this paragraph (5) shall not apply in the case of an employee who is in sole charge of an independent establishment or a physically separated branch establishment, or who owns at

least a 20 percent interest in the enterprise in which he is employed; and

(6) Who is compensated for his services on a salary basis at a rate of not less than \$155 per week exclusive of board, lodging, and other facilities: *Provided*, That an employee who is compensated on a salary rate of not less than \$250 per week (exclusive of board, lodging, or other facilities), and whose primary duty consists of the management of the enterprise in which he is employed or of a customarily recognized department or subdivision thereof, and includes the customary and regular direction of the work of two or more other employees therein, shall be deemed to meet all of the requirements of this section.

[Order 76-5, § 296-128-510, filed 2/24/76.]

WAC 296-128-520 Administrative. The term "individual employed in a bona fide . . . administrative . . . capacity" in RCW 49.46.010 (5)(c) shall mean any employee:

(1) Whose primary duty consists of the performance of office or non-manual field work directly related to management policies or general business operations of his employer or his employer's customers; or

(2) The performance of functions in the administration of a school system, or educational establishment or institution, or of a department or subdivision thereof, in work directly related to the academic instruction or training carried on therein; and

(3) Who customarily and regularly exercises discretion and independent judgment; and

(a) Who regularly and directly assists a proprietor, or an employee employed in a bona fide executive or administrative capacity (as such terms are defined in this regulation), or

(b) Who performs under only general supervision work along specialized or technical lines requiring special training, experience or knowledge, or

(c) Who executes under only general supervision special assignments and tasks; and

(4) Who does not devote more than 20 percent, or, in the case of an employee of a retail or service establishment who does not devote as much as 40 percent of his hours worked in the work week to activities which are not directly and closely related to the performance of the work described in paragraphs (1) through (3) of this section; and

(a) Who is compensated for his services on a salary or fee basis at a rate of not less than \$155 per week exclusive of board, lodging, or other facilities; or

(b) Who, in the case of academic administrative personnel is compensated for his services as required by paragraph (4)(a) of this section, or on a salary basis which is at least equal to the entrance salary for teachers in the school system, educational establishment, or institution by which he is employed: *Provided*, That an employee who is compensated on a salary or fee basis at a rate of not less than \$250 per week (exclusive of board, lodging, or other facilities), and whose primary duty consists of the performance of office or non-manual work directly related to management policies or general business operations of his employer or his employer's customers; which includes work requiring the

exercise of discretion and independent judgment, shall be deemed to meet all of the requirements of this section.

[Order 76-5, § 296-128-520, filed 2/24/76.]

WAC 296-128-530 Professional. The term "individual employed in a bona fide . . . professional capacity" in RCW 49.46.010 (5)(c) shall mean any employee:

(1) Whose primary duty consists of the performance of work:

(a) Requiring knowledge of an advanced type in a field of science or learning customarily acquired by a prolonged course of specialized intellectual instruction and study, as distinguished from a general academic education and from an apprenticeship, and from training in the performance of routine mental, manual, or physical processes, or

(b) Original and creative in character in a recognized field of artistic endeavor (as opposed to work which can be produced by a person endowed with general manual or intellectual ability and training), and the result of which depends primarily on the intention, imagination, or talent of the employee; or

(c) Teaching, tutoring, instructing, or lecturing in the activity of imparting knowledge and who is employed and engaged in this activity as a teacher in the school system or educational establishment or institution by which he is employed; and

(2) Whose work requires the consistent exercise of discretion and judgment in its performance; and

(3) Whose work is predominantly intellectual and varied in character (as opposed to routine mental, manual, mechanical or physical work) and is of such a character that the output produced or the result accomplished cannot be standardized in relation to a given period of time; and

(4) Who does not devote more than 20 percent of his hours worked in the work week to activities which are not an essential part of and necessarily incident to the work described in paragraphs (1) through (3) of this section; and

(5) Who is compensated for his services on a salary or fee basis at a rate of not less than \$170 per week exclusive of board, lodging, or facilities: *Provided*, That this paragraph (5) shall not apply in the case of an employee who is the holder of a valid license or certificate permitting the practice of law, medicine, or dentistry and who is actually engaged in the practice thereof: *Provided*, That an employee who is compensated on a salary or fee basis at a rate of not less than \$250 per week (exclusive of board, lodging, or other facilities), and whose primary duty consists of the performance of work either requiring knowledge of an advanced type in a field of science or learning, which includes work requiring the consistent exercise of discretion and judgment, or requiring invention, imagination, or talent in a recognized field of artistic endeavor, shall be deemed to meet all of the requirements of this section.

[Order 76-5, § 296-128-530, filed 2/24/76.]

WAC 296-128-540 Outside salesman. The term "individual employed in the capacity of outside salesman" in RCW 49.46.010 (5)(c) shall mean any employee:

(1) Who is employed for the purpose of and who is customarily and regularly engaged away from his employer's place or places of business, as well as on the premises

(where the employee regulates his own hours and the employer has no control over the total number of hours worked) in the following alternative activities:

(a) In making sales; including any sale, exchange, contract to sell, consignment for sale, shipment for sale or other disposition; or

(b) In obtaining orders or contracts for services or for the use of facilities for which a consideration will be paid by the client or customer; or

(c) In demonstrating products or equipment for sale; or

(d) In the sale of services and performance of the service sold when the compensation to the employee is computed on a commission basis; and

(2) Whose hours of work of a nature other than that described in (1)(a), (b), (c) and (d) of this section do not exceed 20 percent of the hours worked in the work week by nonexempt employees of the employer: *Provided*, That work performed incidental to and in conjunction with the employee's own outside sales or solicitations, including incidental deliveries and collections, shall not be regarded as nonexempt work; and

(3) Who is compensated by the employer on a guaranteed salary, commission or fee basis and who is advised of his status as "outside salesman."

[Order 76-5, § 296-128-540, filed 2/24/76.]

WAC 296-128-550 Regular rate of pay. The regular rate of pay shall be the hourly rate at which the employee is being paid, but may not be less than the established minimum wage rate. Employees who are compensated on a salary, commission, piece rate or percentage basis, rather than an hourly wage rate, unless specifically exempt, are entitled to one and one-half times the regular rate of pay for all hours worked in excess of 40 per week. The overtime may be paid at one and one-half times the piecework rate during the overtime period, or the regular rate of pay may be determined by dividing the amount of compensation received per week by the total number of hours worked during that week. The employee is entitled to one and one-half times the regular rate arrived at for all hours worked in excess of 40 per week.

[Order 76-5, § 296-128-550, filed 2/24/76.]

WAC 296-128-560 Compensating time off in lieu of overtime pay. The provisions of chapter 49.46 RCW requiring one and one-half times the regular rate of pay for hours worked in excess of 40 per week does not apply to any person who requests compensating time off in lieu of overtime pay. Therefore, compensating time may be as agreed upon by the employer and the individual employee at the request of the employee, but may not be imposed by the employer in lieu of overtime pay upon any employee who has not so requested such compensating time off.

[Order 76-5, § 296-128-560, filed 2/24/76.]

Chapter 296-129 WAC

INDUSTRIAL WELFARE COMMITTEE APPEAL PROCEDURES

WAC

296-129-020	Appeal briefs.
296-129-030	Appeal briefs—Contents.
296-129-040	Record on appeal.

Reviser's note: For standards of labor for the protection of the safety, health and welfare of employees for all occupations subject to chapter 49.12 RCW, see also chapter 296-126 WAC.

WAC 296-129-020 Appeal briefs. Appeal briefs may be filed in the office of the committee's secretary by the respective parties to the appeal on their own behalf or by someone representing them thirty days following the filing of the notice of appeal. Any party to the appeal filing an appeal brief may request that the hearing of oral arguments upon the appeal be held before the committee. The time, place and date for hearing oral arguments, when granted, shall be scheduled after the expiration of the time for filing briefs and the notice sent to all parties to the appeal where such an oral argument is deemed desirable by the committee.

[Order 74-9, § 296-129-020, filed 3/13/74, effective 4/15/74.]

WAC 296-129-030 Appeal briefs—Contents. An appeal brief, if filed, shall consist of the following:

(1) Statement of the case. A brief statement of the nature of the case which is the subject of the appeal and a clear and concise statement of the facts appropriate to an understanding of the nature of the controversy.

(2) Assignments of error. Each error relied upon and served with the notice of appeal shall be clearly pointed out. Whenever error is assigned to any finding of fact or conclusion of the department employee, so much of the finding or conclusion claimed to be erroneous should be set out verbatim in the brief.

(3) Appellant's brief should set forth and discuss the authorities in support of the position of the appellant and shall be designed and arranged to address the assignments of error and the issues arising therefrom.

(4) Respondent's brief should contain argument and discussion in opposition to the assignments of error of the appellant, and/or in support of the decision or rulings of the departmental employee or agent.

[Order 74-9, § 296-129-030, filed 3/13/74, effective 4/15/74.]

WAC 296-129-040 Record on appeal. Upon receipt of a copy of the notice of appeal, whether informal or formal, the departmental employee or agent shall promptly cause to be prepared and forwarded to the office of the secretary of the committee the record on appeal which shall include a transcript of the proceedings of any hearing that may have been held by said employee or agent, the originals of all exhibits or documentary evidence received by the employee during the course of any hearing and any other papers or evidence before the employee relied upon in arriving at the decision. All exhibits shall be appropriately and plainly marked for reference. In addition, the employee shall certify in the appropriately titled case the record on appeal as containing all evidence, matters and things coming

before said employee at any hearing relied upon in making his findings, conclusions, decisions and any remedial order. A copy of the record on appeal, or any portion thereof, may be obtained by any party to the appeal on payment to the employee of the reasonable cost per page.

[Order 74-9, § 296-129-040, filed 3/13/74, effective 4/15/74.]

Chapter 296-130 WAC FAMILY CARE

WAC

296-130-010	Declaration of purpose.
296-130-020	Definitions.
296-130-030	Employee rights.
296-130-035	Employee complaints.
296-130-040	Prohibited action.
296-130-050	Posting.
296-130-060	Notices of infraction.
296-130-065	Service on employers.
296-130-070	Appeal of infraction notice.
296-130-080	Penalty assessment.
296-130-500	Collective bargaining not impaired.

WAC 296-130-010 Declaration of purpose. It is in the public interest for employers to accommodate employees by providing reasonable leaves from work for family reasons. This chapter serves to establish a minimum standard allowing an employee to use the employee's accrued sick leave to care for a child of the employee.

[Statutory Authority: RCW 43.22.270 and 1988 c 236. 88-18-044 (Order 88-20), § 296-130-010, filed 8/31/88.]

WAC 296-130-020 Definitions. (1) "Employer" means any person, firm, corporation, partnership, business trust, legal representative, or other business entity which engages in any business, industry, profession, or activity in this state and employs one or more employees. Employer also includes the state, any state institution, any state agency, political subdivisions of the state, and any municipal corporation or quasi-municipal corporation.

(2) "Employee" means a worker who is employed in the business of an employer. "Employee," for the purposes of this chapter, also includes workers performing in an executive, administrative, professional, or outside sales capacity.

(3) "Employ" means to engage, suffer, or permit to work.

(4) "Accrued sick leave" means leave which the employee has accumulated by earning a certain number of hours or days per month or per year which the employee is entitled to use to continue his or her normal compensation during absences due to illness, accident, or other conditions which require medical treatment or supervision, and which is provided for by a collective bargaining agreement, employer/employee agreement, employer policy, ordinance, or civil service rule.

It does not include annual leave, vacation leave, or personal leave. It does not include any benefit which includes leave granted by short-term or long-term disability plans except in a case where those plans include a separate and identifiable component which allows the employee to accumulate by earning a certain number of hours or days per month or per year which the employee is entitled to use to

continue his or her normal compensation in absence due to illness, accident, or other conditions which require medical treatment or supervision which is provided for by a collective bargaining agreement, employer/employee agreement, employee/employer policy, ordinance, or civil service rule. In a case where a short-term or long-term disability plan includes a separate and identifiable component which allows the employee to accumulate leave by earning a certain number of hours or days per month or per year which the employee is entitled to use to continue his or her normal compensation in absence due to illness, accident, or other conditions which require medical treatment or supervision, only that separate identifiable portion shall be considered accrued sick leave.

(5) "Child of the employee" means any child under the age of eighteen who is:

(a) The natural offspring of the employee;

(b) The adopted child of the employee;

(c) The natural or adopted child of the employee's spouse; or

(d) Is under the employee's legal guardianship, legal custody, or foster care.

(6) "Health condition that requires treatment or supervision" shall include:

(a) Any medical condition requiring medication that the child cannot self medicate;

(b) Any medical or mental health condition which would endanger the child's safety or recovery without the presence of a parent or guardian; or

(c) Any condition warranting preventive health care such as physical, dental, optical or immunization services, when a parent must be present to authorize and when sick leave may otherwise be used for the employee's preventive health care.

(7) "Infraction" means an alleged violation of RCW 49.12.____ (chapter 236, Laws of 1988) as cited by the department.

(8) "Administrative law judge" means any person appointed by the chief administrative law judge, as defined in RCW 34.12.020(2) to preside at contested cases convened under RCW 49.12.____ (chapter 236, Laws of 1988).

(9) "Department" means the department of labor and industries.

[Statutory Authority: RCW 43.22.270 and 1988 c 236. 88-18-044 (Order 88-20), § 296-130-020, filed 8/31/88.]

WAC 296-130-030 Employee rights. An employer shall allow an employee to use the employee's accrued sick leave, when such benefit exists, to care for the child of the employee under the age of eighteen with a health condition that requires treatment or supervision as defined in WAC 296-130-020(6). In all other instances the same benefits and requirements that would govern the employee's personal use of accrued sick leave shall apply to the use of sick leave for the child's treatment or supervision. Nothing in this section requires an employer to provide sick leave.

[Statutory Authority: RCW 43.22.270 and 1988 c 236. 88-18-044 (Order 88-20), § 296-130-030, filed 8/31/88.]

WAC 296-130-035 Employee complaints. (1) An employee who believes that his or her employer has not

complied with RCW 49.12.____ (chapter 236, Laws of 1988), or with the rules promulgated thereto, may file a complaint with the department within six months of the alleged violation. The complaint should contain the following:

- (a) The name and address of the employee making the complaint;
- (b) The name, address, and telephone number of the employer against whom the complaint is made;
- (c) A statement of the specific fact which constitute the alleged violation, including the date(s) on which the alleged violation occurred.

(2) Upon receipt of a complaint, the department shall forward written notice of the complaint to the employer, along with a warning of prohibited actions as stated in WAC 296-130-040.

(3) The department may investigate any complaint it deems appropriate. If the department determines that a violation of this chapter has occurred, it may issue a notice of infraction pursuant to WAC 296-130-060.

[Statutory Authority: RCW 43.22.270 and 1988 c 236. 88-23-117 (Order 88-29), § 296-130-035, filed 11/23/88.]

WAC 296-130-040 Prohibited action. No employer shall discharge or in any other way discriminate against or penalize any employee because he/she sought any information about family leave provisions, has filed a complaint alleging a violation of the chapter or exercised any right granted under the law. Nothing in this section however, shall prohibit an employer from applying its attendance policies.

[Statutory Authority: RCW 43.22.270 and 1988 c 236. 88-18-044 (Order 88-20), § 296-130-040, filed 8/31/88.]

WAC 296-130-050 Posting. (1) The department shall furnish each employer a poster describing an employee's rights and an employer's obligations provided in this chapter.

(2) The employer shall keep posted a current edition department poster stipulating the provisions of this chapter. The employer shall display this poster in a conspicuous place.

(3) The employer shall post its leave policies, if any, in a conspicuous place accessible to the employees at the employer's place of business.

(4) The posting requirement for employees whose leave policies are specified by individual contracts may be satisfied by stating that leave for such employees will be governed by the terms of such contracts.

(5) Employers with informal leave policies which are established on a case-by-case basis may satisfy the posting requirement by posting a statement explaining that policy.

[Statutory Authority: RCW 43.22.270 and 1988 c 236. 88-18-044 (Order 88-20), § 296-130-050, filed 8/31/88.]

WAC 296-130-060 Notices of infraction. The department may issue a notice of infraction to an employer who violates RCW 49.12.____ (chapter 236, Laws of 1988). The employment standards supervisor shall direct that notices of infraction contain the following when issued.

(1) A statement that the notice represents a determination that the infraction has been committed by the employer

named in the notice and that the determination shall be final unless contested;

(2) A statement that the infraction is a noncriminal offense for which imprisonment shall not be imposed as a sanction;

(3) A statement of the specific violation which necessitated issuance of the infraction;

(4) A statement of the penalty involved if the infraction is established;

(5) A statement informing the employer of the right to a hearing conducted pursuant to chapter 34.04 RCW if requested within twenty days of issuance of the infraction;

(6) A statement that at any hearing to contest the notice of infraction the state has the burden of proving, by a preponderance of the evidence, that the infraction was committed, and that the employer may subpoena witnesses including the agent that issued the notice of infraction;

(7) If a notice of infraction is personally served upon a supervisory or managerial employee of a firm or corporation, the department shall within ten days of service send a copy of the notice by certified mail to the employer;

(8) Constructive service may be made by certified mail directed to the employer named in the notice of infraction.

[Statutory Authority: RCW 43.22.270 and 1988 c 236. 88-18-044 (Order 88-20), § 296-130-060, filed 8/31/88.]

WAC 296-130-065 Service on employers. (1) If an employer is a corporation or a partnership, the department need not serve the employer personally. In such a case, if no officer or partner of a violating employer is present, the department may issue a notice of infraction to any supervisor or managerial employee.

(2) If the department serves a notice of infraction on a supervisory or managerial employee, and not on an officer, or partner of the employer, the department shall mail by certified mail a copy of the notice of infraction to the employer. The department shall mail a second copy by ordinary mail.

[Statutory Authority: RCW 43.22.270 and 1988 c 236. 88-18-044 (Order 88-20), § 296-130-065, filed 8/31/88.]

WAC 296-130-070 Appeal of infraction notice. (1) If an employer desires to contest the notice of infraction issued, the employer shall file two copies of a notice of appeal with the department at the office designated on the notice of infraction, within twenty days of issuance of the infraction.

(2) The department shall conduct a hearing in accordance with chapter 34.04 RCW and chapter 10-08 WAC.

(3) Employers may appear before the administrative law judge through counsel, or may represent themselves. The department shall be represented by the attorney general.

(4) All relevant evidence shall be admissible in a hearing convened pursuant to RCW 49.12.____ (chapter 236, Laws of 1988). Admission of evidence is subject to RCW 34.04.100 and 34.04.105 of the Administrative Procedure Act of Washington.

(5) The administrative law judge shall issue a proposed decision that includes findings of fact, conclusions of law, and if appropriate, any legal penalty. The proposed decision shall be served by certified mail or personally on the

employer and the department. The employer or department may appeal to the director within thirty days after the date of issuance of the proposed decision. If none of the parties appeals within thirty days, the proposed decision may not be appealed either to the director or the courts.

(6) An appellant must file with the director an original and four copies of its notice of appeal. The notice of appeal must specify which findings and conclusions are erroneous. The appellant must attach to the notice the written arguments supporting its appeal.

The appellant must serve a copy of the notice of appeal and the arguments on the other parties. The respondent parties must file with the director their written arguments within thirty days after the date the notice of appeal and the arguments were served upon them.

(7) The director shall review the proposed decision in accordance with the Administrative Procedure Act, chapter 34.04 RCW. The director may: Allow the parties to present oral arguments as well as the written arguments; require the parties to specify the portions of the record on which the parties rely; require the parties to submit additional information by affidavit or certificate; remand the matter to the administrative law judge for further proceedings; and require a departmental employee to prepare a summary of the record for the director to review. The director shall issue a final decision that can affirm, modify, or reverse the proposed decision.

(8) The director shall serve the final decision on all parties. Any aggrieved party may appeal the final decision to superior court pursuant to RCW 34.04.130 unless the final decision affirms an unappealed proposed decision. If no party appeals within the period set by RCW 34.04.130, the director's decision is conclusive and binding on all parties.

[Statutory Authority: RCW 43.22.270 and 1988 c 236. 88-18-044 (Order 88-20), § 296-130-070, filed 8/31/88.]

WAC 296-130-080 Penalty assessment. An employer found to have committed an infraction under RCW 49.12.____ (chapter 236, Laws of 1988) may be assessed the maximum penalty of a fine of two hundred dollars for the first noncompliance violation. An employer that continues to violate the terms of the statute may be subject to a fine not to exceed one thousand dollars for each violation.

[Statutory Authority: RCW 43.22.270 and 1988 c 236. 88-18-044 (Order 88-20), § 296-130-080, filed 8/31/88.]

WAC 296-130-500 Collective bargaining not impaired. Nothing in this chapter shall be deemed to interfere with, impede, or in any way diminish the right of employees to bargain collectively with their employers through representatives of their own choosing in order to establish leave benefits in excess of the applicable minimum under the provisions of this chapter.

[Statutory Authority: RCW 43.22.270 and 1988 c 236. 88-18-044 (Order 88-20), § 296-130-500, filed 8/31/88.]

Chapter 296-131 WAC

AGRICULTURAL EMPLOYMENT STANDARDS

WAC

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WAC 296-131-001 Applicability. These standards, adopted pursuant to sections 83 through 86, chapter 380, Laws of 1989, shall apply to persons employed in agricultural labor as defined in RCW 50.04.150 and WAC 296-131-005. The standards in this chapter beginning at WAC 296-131-100 shall apply only to minors employed in agricultural labor. The standards in this chapter do not apply to the immediate family members of the officers of any business engaged in agricultural production of crops or livestock.

[Statutory Authority: RCW 49.30.030. 90-14-038, § 296-131-001, filed 6/29/90, effective 11/1/90. Statutory Authority: RCW 43.22.270, 1989 c 380 and chapter 49.46 RCW. 89-22-015 (Order 89-15), § 296-131-001, filed 10/24/89, effective 11/24/89.]

WAC 296-131-005 Definitions. For the purpose of these rules:

(1) A "minor" is a person of either gender, employed in agricultural labor, who is under the age of eighteen years.

(2) "Agricultural labor" is defined as services performed:

(a) On a farm, in the employ of any person, in connection with the cultivation of the soil, or in connection with raising or harvesting any agricultural or horticultural commodity, including raising, shearing, feeding, caring for, training, and management of livestock, bees, poultry, and furbearing animals and wildlife, or in the employ of the owner or tenant or other operator of a farm in connection with the operation, management, conservation, improvement, or maintenance of such farm and its tools and equipment; or

(b) In packing, packaging, grading, storing, or delivering to storage, or to market or to a carrier for transportation to market, any agricultural or horticultural commodity; but only if such service is performed as incident to ordinary farming operations.

"Agricultural labor" does not include employment in commercial packing houses, commercial storage establishments, commercial canning, commercial freezing, or any other commercial processing with respect to services performed in connection with the cultivation, raising, harvesting and processing of oysters or raising and harvesting of mushrooms or in connection with any agricultural or

horticultural commodity after its delivery to a terminal market for distribution for consumption.

(3) "Department" means the department of labor and industries.

(4) "Director" means the director of the department of labor and industries.

(5) "Employ" means to engage, suffer, or permit to work in agricultural labor.

(6) "Employee" means any person employed by an employer, except those who are members of the immediate family of an employer.

(7) "Employer" means any person, firm, corporation, partnership, business trust, legal representative, or other business entity that engages in any agricultural activity in this state and employs one or more employees.

[Statutory Authority: RCW 49.30.030. 90-14-038, § 296-131-005, filed 6/29/90, effective 11/1/90.]

WAC 296-131-006 Authority to enter, inspect, and investigate places of employment and records, and to conduct interviews. In order to carry out the purposes of this chapter, the director or the director's authorized representative is authorized:

(1) To enter without delay any work site or area or other environment where work is performed by an employee or where employment records are, or are required to be, maintained; and

(2) To inspect, transcribe, and copy all pertinent records, and to inspect and investigate any such place of employment and all pertinent conditions, structures, machines, apparatus, devices, equipment, and materials therein, and to question privately any employer, owner, operator, agent, or employee.

[Statutory Authority: RCW 49.30.030 and 43.22.310. 92-15-099, § 296-131-006, filed 7/20/92, effective 8/20/92.]

WAC 296-131-010 Payment interval. All wages due shall be paid at no longer than monthly intervals to each employee on established regular pay days, unless federal law requires more frequent pay intervals. To facilitate bookkeeping, an employer may implement a regular payroll system in which wages from up to seven days before pay day may be withheld from the pay period covered and included in the next pay period.

[Statutory Authority: RCW 43.22.270, 1989 c 380 and chapter 49.46 RCW. 89-22-015 (Order 89-15), § 296-131-010, filed 10/24/89, effective 11/24/89.]

WAC 296-131-015 Pay statements. A pay statement shall be provided to each employee at the time wages are paid. The pay statement shall identify the employee, show the number of hours worked or the number of days worked based on an eight-hour day, the rate or rates of pay, the number of piece work units earned if paid on a piece work basis, the gross pay, the pay period, all deductions and the purpose of each deduction for the respective pay period. A pay statement shall also include the employer's name, address, and telephone number.

[Statutory Authority: RCW 43.22.270, 1989 c 380 and chapter 49.46 RCW. 89-22-015 (Order 89-15), § 296-131-015, filed 10/24/89, effective 11/24/89.]

WAC 296-131-017 Employment records. (1) Every employer shall keep for at least three years a record of the name, address, and occupation of each employee, dates of employment, rate or rates of pay, amount paid each pay period to each such employee and the hours worked.

(2) Every employer shall make the records described in subsection (1) of this section available to the director or the director's authorized representative at any time for inspection and transcription or copying and to the employee, upon request for that employee's work record, at any reasonable time.

[Statutory Authority: RCW 43.22.270, 1989 c 380 and chapter 49.46 RCW. 89-22-015 (Order 89-15), § 296-131-017, filed 10/24/89, effective 11/24/89.]

WAC 296-131-020 Meals and rest periods. (1) Every employee employed more than five hours shall receive a meal period of at least thirty minutes. Employees working eleven or more hours in a day shall be allowed at least one additional thirty-minute meal period.

(2) Every employee shall be allowed a rest period of at least ten minutes, on the employer's time, in each four-hour period of employment. For purposes of computing the minimum wage on a piecework basis, the time allotted an employee for rest periods shall be included in the number of hours for which the minimum wage must be paid.

[Statutory Authority: RCW 49.30.030. 90-14-037, § 296-131-020, filed 6/29/90, effective 8/1/90.]

WAC 296-131-100 Permits to employ minors. (1) Within three days after the commencement of employment of one or more minors, an employer shall file with the department an application for a permit to employ minors. When validated by the supervisor of employment standards, this permit will authorize the employer to employ for one year any number of minor workers at the workplace specified in accordance with the conditions of the permit and the regulations established in this chapter.

(2) An employer shall at all times employ minors in accordance with the regulations established in this chapter, regardless whether the employer has filed with the department an application for a permit to employ minors as required in subsection (1) of this section.

(3) The department shall annually publicize the requirements of this chapter through departmental publications and other appropriate means designed to assist employers in complying with the law.

[Statutory Authority: RCW 49.30.030. 90-14-038, § 296-131-100, filed 6/29/90, effective 11/1/90.]

WAC 296-131-105 Parental and school authorization. (1) An employer of a minor shall be required to annually obtain written authorization from a minor's parent before employing the minor.

(2) Except when performing intermittent weekend work, a minor who is legally required to attend school and who is working during the school year shall obtain from his or her school written authorization to work a specified number of hours per day and per week up to the maximum permitted in WAC 296-131-120, based on an evaluation of the impact of work on the student's academic performance. School authorization is not required for high school graduates.

(3) The parental and school authorization required by this chapter shall be on forms supplied by the department and shall be kept on file by the employer.

(4) Neither parent nor school authorization is required for minors who are emancipated by court order.

(5) For purposes of this section, "intermittent weekend work" is defined as work during the weekend arranged to be performed after the end of the preceding school week. Work performed after the beginning of the next school day is not considered to be intermittent weekend work and requires school authorization. Work during more than two weekends per quarter is not considered to be intermittent weekend work.

[Statutory Authority: RCW 49.30.030. 90-14-038, § 296-131-105, filed 6/29/90, effective 11/1/90.]

WAC 296-131-110 Posting. (1) At least one copy of a valid permit to employ minors shall be posted in a conspicuous place at the workplace specified in the permit.

(2) An informational poster supplied by the department, describing in English and Spanish the rights of agricultural employees under this chapter, also shall be posted in a conspicuous place at the workplace specified in the permit.

[Statutory Authority: RCW 49.30.030. 90-14-038, § 296-131-110, filed 6/29/90, effective 11/1/90.]

WAC 296-131-115 Age of employment. No minor under the age of fourteen shall be employed in agriculture at any time except as follows: Minors twelve and thirteen years of age may be employed in the hand harvest of berries, bulbs, and cucumbers and in the hand cultivation of spinach during weeks when school is not in session.

[Statutory Authority: RCW 49.30.030. 90-14-038, § 296-131-115, filed 6/29/90, effective 11/1/90.]

WAC 296-131-120 Hours of work for minors in agriculture. (1) Minors legally required to attend school may not be employed during school hours except by special permission from school officials as provided in RCW 28A.27.010 and 28A.27.090.

(2)(a) Minors under the age of sixteen may work up to three hours a day on school days, up to eight hours a day on nonschool days and up to twenty-one hours a week during weeks when school is in session. Minors under the age of sixteen may work up to eight hours a day and up to forty hours a week during weeks when school is not in session.

(b) Except as otherwise provided, on days when school is in session, minors under the age of sixteen may not be employed before 7:00 a.m. nor after 8:00 p.m. On days when school is not in session, minors under the age of sixteen may not be employed before 5:00 a.m. nor after 9:00 p.m. On days when school is in session, minors under the age of sixteen employed in animal agriculture or whose employment in crop production requires daily attention to irrigation, may be employed beginning at 6:00 a.m.

(3)(a) Minors who are sixteen and seventeen years of age may work up to twenty-eight hours a week, up to four hours a day on school days and up to eight hours a day on nonschool days during weeks when school is in session. Minors who are sixteen and seventeen years of age may work up to ten hours per day and up to fifty hours per week

during weeks when school is not in session. Minors who are sixteen and seventeen years of age may work up to sixty hours per week in the mechanical harvest of peas, wheat, and hay during weeks when school is not in session.

(b) Minors who are sixteen and seventeen years of age may not be employed before 5:00 a.m. nor after 10:00 p.m. Minors who are sixteen and seventeen years of age may not work later than 9:00 p.m. on more than two consecutive nights preceding a school day.

(4) Except for minors employed in dairy or livestock production, in the harvest of hay, or whose employment in crop production requires daily attention to irrigation, no minor shall be employed more than six days in any one week.

(5) The provisions of this section shall not apply to minors sixteen years of age and older who can demonstrate emancipation by either (a) providing a marriage certificate as proof of marriage, or (b) providing a birth certificate that names the minor as a parent. Copies of such documents must be retained by the employer for one year, pursuant to the requirements of WAC 296-131-130.

[Statutory Authority: RCW 49.30.030 and 43.22.310. 92-15-099, § 296-131-120, filed 7/20/92, effective 8/20/92. Statutory Authority: RCW 49.30.030. 90-14-038, § 296-131-120, filed 6/29/90, effective 11/1/90.]

WAC 296-131-125 Prohibited and hazardous employment. (1) Employment in the following occupations in agriculture is prohibited to minors under the age of sixteen:

(a) Operating a tractor of over 20 PTO horsepower, or connecting or disconnecting an implement or any of its parts to or from such a tractor.

(b) Operating or assisting to operate (including starting, stopping, adjusting, feeding, or any other activity involving physical contact associated with the operation) any of the following machines:

(i) Corn picker, cotton picker, grain combine, hay mower, forage harvester, hay baler, potato digger, or mobile pea viner;

(ii) Feed grinder, crop dryer, forage blower, auger conveyor, or the unloading mechanism of a nongravity-type self-unloading wagon or trailer; or

(iii) Power post-hole digger, power post driver, or nonwalking type rotary tiller.

(c) Operating or assisting to operate (including starting, stopping, adjusting, feeding, or any other activity involving physical contact associated with the operation) any of the following machines:

(i) Trencher or earthmoving equipment;

(ii) Fork lift; or

(iii) Potato combine.

(d) Working on a farm in a yard, pen, or stall occupied by a:

(i) Bull, boar, or stud horse maintained for breeding purposes; or

(ii) Sow with suckling pigs, or cow with newborn calf (with umbilical cord present).

(e) Felling, bucking, skidding, loading, or unloading timber with butt diameter of more than six inches.

(f) Working from a ladder or scaffold (painting, repairing, or building structures, pruning trees, picking fruit, etc.) at a height of over twenty feet.

(g) Driving a bus, truck, or automobile when transporting passengers, or riding on a tractor as a passenger or helper.

(h) Working inside:

(i) A fruit, forage, or grain storage designed to retain an oxygen deficient or toxic atmosphere;

(ii) An upright silo within two weeks after silage has been added or when a top unloading device is in operating position;

(iii) A manure pit; or

(iv) A horizontal silo while operating a tractor for packing purposes.

(i) Working in any manufacturing occupation.

(j) Working in any processing operations, including food processing.

(k) Working in transportation, warehouse, and storage or construction.

(l) Work in or about engine or boiler rooms.

(m) Work in freezers, meat coolers, and all work in preparing meats for sale. (Wrapping, sealing, labeling, weighing, pricing, and stocking are permitted if work is performed away from meat-cutting and preparation areas.)

(2) Employment in the following occupations in agriculture is prohibited to all minors:

(a) Handling, mixing, loading or applying (including cleaning or decontaminating equipment, disposal or return of empty containers, or serving as a flagman for aircraft applying) agricultural chemicals classified under the Federal Insecticide, Fungicide, and Rodenticide Act (7 U.S.C. 135 et seq.) as Category I of toxicity, identified by the word "poison" and the "skull and crossbones" on the label; or Category II of toxicity, identified by the word "warning" on the label.

(b) Handling or using a blasting agent, including but not limited to, dynamite, black powder, sensitized ammonium nitrate, blasting caps, and primer cord.

(c) Transporting, transferring, or applying anhydrous ammonia.

(d) Work involving circular, band or chain saws, power driven wood working machines, power driven metal forming, punching and shearing machines, and guillotine shears.

(e) Work involving slaughtering, meat packing, or processing and rendering.

(f) Work involving wrecking and demolition.

(g) Work involving roofing.

(h) Work involving mechanical excavation.

(i) Work in any place where a strike or lockout exists.

(3) The employment prohibited by subsection (1) of this section shall not apply to the employment of any minor as a vocational agriculture student-learner in any of the occupations described in subsection (1)(a), (b), (c), (d), (e), or (f) of this section when each of the following requirements are met:

(a) The student-learner is enrolled in a vocational education training program in agriculture under a recognized state or local educational authority, or in a substantially similar program conducted by a private school;

(b) Such student-learner is employed under a written agreement which provides that the work of the student-

learner is incidental to his training; that such work shall be intermittent, for short periods of time, and under the direct and close supervision of a qualified and experienced person; that safety instruction shall be given by the school and correlated by the employer with on-the-job training; and that a schedule of organized and progressive work processes to be performed on the job have been prepared;

(c) Such written agreement contains the name of the student-learner, and is signed by the employer and by a person authorized to represent the educational authority or school; and

(d) Copies of each such agreement are kept on file by both the educational authority or school and by the employer.

(4) The employment prohibited by subsection (1) of this section shall not apply to the employment of any minor in those occupations for which the minor has successfully completed one or more federal extension service training programs described in 29 C.F.R. section 570.72(b) and who has been instructed by the employer in the safe and proper operation of the specific equipment to be used, who is continuously and closely supervised by the employer where feasible or, where not feasible, in work such as cultivating, whose safety is checked by the employer at least at mid-morning, noon, and midafternoon, or during the first and second halves of the workday, whichever is more frequent.

(5) The employment prohibited by subsection (1) of this section shall not apply to the employment of any minor in those occupations for which the minor has successfully completed one or more of the vocational agriculture training programs described in 29 C.F.R. section 570.72(c) and who has been instructed by the employer in the safe and proper operation of the specific equipment to be used, who is continuously and closely supervised by the employer where feasible or, where not feasible, in work such as cultivating, whose safety is checked by the employer at least at mid-morning, noon, and midafternoon, or during the first and second halves of the workday, whichever is more frequent.

(6) No minor shall be permitted to ride in or work in the vicinity of a vehicle driven by any person who is under the age of sixteen or anyone who does not possess a valid driver's license.

(7) No minor shall be employed in agriculture in the harvest of any crop to which agricultural chemicals described in subsection (2)(a) of this section have been applied, prior to the expiration of the preharvest interval or within fourteen days after the application if no preharvest interval has been established.

(8) If, upon inspection or investigation, the director or the director's designee believes that an employer is violating this section creating a danger from which there is a substantial probability that death or serious physical harm could result to a minor employee, the director or the director's designee may issue an order under RCW 34.05.479 immediately restraining the condition, practice, method, process, or means creating the danger and suspend the employer's permit authorizing employment of minors until action is taken to avoid, correct, or remove the danger.

(9) A copy of the federal regulations referenced in subsections (4) and (5) of this section may be obtained from the department upon request.

[Statutory Authority: RCW 49.30.030. 90-14-038, § 296-131-125, filed 6/29/90, effective 11/1/90.]

WAC 296-131-126 Lifting. Where weights in excess of twenty pounds are to be lifted, carried, pushed, or pulled as a normal part of an employee's responsibility, the employer shall instruct minors on correct weight lifting techniques prior to the commencement of work and display a poster developed by the department illustrating correct weight lifting techniques.

[Statutory Authority: RCW 49.30.030. 90-14-038, § 296-131-126, filed 6/29/90, effective 11/1/90.]

WAC 296-131-130 Recordkeeping. In addition to the records required under WAC 296-131-017, an employer is responsible for obtaining and keeping on file for one year the following information concerning each minor employee:

(1) Proof of age by means of a copy of one of the following: Birth certificate; driver's license; baptismal record; Bible record; insurance policy at least one year old indicating the date of birth; witnessed statement of the parent or guardian; or a completed federal employment eligibility verification (Form I-9);

(2) Parental authorization required by WAC 296-131-105;

(3) School authorization required by WAC 296-131-105;

(4) Documentation of emancipation as provided by WAC 296-131-120(5).

Every employer shall make the records described in this section available to the director or the director's authorized representative at any time for inspection and transcription or copying and to the employee, upon request for that employee's work record, at any reasonable time.

[Statutory Authority: RCW 49.30.030 and 43.22.310. 92-15-099, § 296-131-130, filed 7/20/92, effective 8/20/92. Statutory Authority: RCW 49.30.030. 90-14-038, § 296-131-130, filed 6/29/90, effective 11/1/90.]

WAC 296-131-135 Revocation of permits. (1) The department may revoke any employer's permit to employ minors upon a showing that the conditions of its issuance are not being met, or that other conditions exist which are detrimental to the health, safety, or welfare of the minor.

(2) The department may refuse to issue or renew a permit to employ minors. If the department refuses to issue or renew a permit, it shall send the employer a notice of denial. The notice of denial shall explain the grounds for denial of the permit. The department may refuse to renew a permit if the conditions of its initial issuance are not being met.

(3) Any employer aggrieved by any action taken by the department under this section may appeal the action or decision by filing notice of the appeal with the director within thirty days of the department's action or decision. Upon receipt of an appeal, a hearing shall be held in accordance with chapter 34.05 RCW. The director shall issue all final orders after the hearing. Final orders are subject to appeal in accordance with chapter 34.05 RCW. Orders not appealed within the time period specified in chapter 34.05 RCW are final and binding.

[Statutory Authority: RCW 49.30.030. 90-14-038, § 296-131-135, filed 6/29/90, effective 11/1/90.]

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WAC 296-131-140 Variances. (1) Upon written application from an employer or an organization representing employers, a variance permitting employment of minors otherwise prohibited under WAC 296-131-120 or 296-131-125 may be granted for good cause shown. The employer or the organization representing employers shall give written notice to the employees so that they may submit their views to the department on any variance request.

(2) The department may afford the applicant and any involved employee, or employee representatives, the opportunity for oral presentation whenever circumstances of the particular application warrant.

(3) "Good cause" shall mean, but not be limited to, those situations in which the employer demonstrates that (a) the granting of the variance would not have a harmful effect upon the health, safety, or welfare of the minor employees involved; (b) the granting of the variance would not have a deleterious effect on school attendance or the academic performance of minors; and (c) the variance is necessary to meet usual crop cultural or harvest requirements.

(4) Upon application from an employer or an organization representing employers a variance permitting employment of minors otherwise prohibited under these rules may be granted by the director or an authorized representative of the director in response to a weather emergency.

[Statutory Authority: RCW 49.30.030. 90-14-038, § 296-131-140, filed 6/29/90, effective 11/1/90.]

Chapter 296-133 WAC

PROCEDURAL RULES SUPPLEMENTARY TO THE HEALTH CARE ACTIVITIES LABOR RELATIONS ACT, CHAPTER 156, LAWS OF 1972 EX. SESS.

WAC

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(1997 Ed.)

WAC 296-133-010 Intent and purpose. These rules are adopted pursuant to the authority of section 8, chapter 156, Laws of 1972 ex. sess., (hereinafter referred to as the "act") as supplementary to the act for the purpose of providing rules of procedure to aid and assist the department of labor and industries, its authorized agents, and interested parties in proceedings under the act. The department of labor and industries, (hereinafter referred to as "department") and its authorized agents may waive any requirements of these rules, unless a party shows that it would be prejudiced by such waiver or unless the rule to be waived involves a mandatory provision of the act.

[Order 72-13, § 296-133-010, filed 7/31/72.]

WAC 296-133-020 Policy. It is the policy of the department to expedite the settlement of labor disputes between health care activities and their employees and to promote peace in labor relations and nothing in these rules should be construed to prevent the department and its authorized agents, where not inconsistent with the intent and purpose of the act, from using its best efforts to adjust through conciliation any labor dispute arising between employers, employees or employee organizations subject to the provisions of the act.

[Order 72-13, § 296-133-020, filed 7/31/72.]

WAC 296-133-030 Construction. These rules shall be liberally construed to effectuate the purposes and provisions of the act.

[Order 72-13, § 296-133-030, filed 7/31/72.]

WAC 296-133-040 General. Any terms used in these rules that are defined in the act shall have the same meaning as set forth therein.

[Order 72-13, § 296-133-040, filed 7/31/72.]

WAC 296-133-050 Petitioner. "Petitioner" shall mean any person, employer or employee association authorized to request the department to take action under the provisions of the act or these rules.

[Order 72-13, § 296-133-050, filed 7/31/72.]

WAC 296-133-060 Authorized agent. "Authorized agent" of the department shall mean the director, the supervisor of industrial relations, a labor mediator or a hearing officer specifically authorized by the director to conduct proceedings under the act.

[Order 72-13, § 296-133-060, filed 7/31/72.]

WAC 296-133-070 Employee association or organization—Qualifications. In order to qualify as an employee association as referred to in section 3 of the act, any such organization or association:

(1) Upon request by the authorized agent, or any party of interest, must produce authentic records of how, when and by whom the organization was formed.

(2) Shall have a written constitution and/or bylaws which plainly indicates that one of the primary purposes of the organization or association is to represent employees in

labor relations matters with employers and is consistent with the requirements of the act and is available for review by any member.

(3) The constitution and/or bylaws must provide:

(a) An approved, customary or recognized method for the nomination and election of officers in accordance with accepted parliamentary procedures, the terms of such officers not to exceed four years.

(b) An approved method of financial record keeping and a financial audit at least once a year, which audit is available to any member for review.

(c) That at least four regular meetings must be held each year with adequate notice of meetings to all members.

(d) That a specific and reasonable minimum number of members or a percentage of the membership must be present to form a quorum before any organization business may be transacted at regular or special meetings.

[Order 72-13, § 296-133-070, filed 7/31/72.]

WAC 296-133-080 Bargaining representative—Selection of—Petition. Applications to the department regarding the selection of a bargaining representative to represent employees of a bargaining unit of an employer shall be by petition on such form or forms as may be provided by the department. A written petition may be accepted by the department if the petition contains substantially the same information required by the forms provided by the department.

[Order 72-13, § 296-133-080, filed 7/31/72.]

WAC 296-133-090 Filing of petition. The petition for certification, decertification or amendment of certification of the representative of a bargaining unit must be filed either:

(1) With the Supervisor, Division of Industrial Relations, Department of Labor and Industries, General Administration Building, Olympia, Washington 98504; or

(2) If the health care activity is situated in western Washington with the Labor Mediator, Division of Industrial Relations, Department of Labor and Industries, 300 West Harrison Street, Seattle, Washington 98119; or

(3) If the health care activity is situated in eastern Washington with the Labor Mediator, Division of Industrial Relations, Department of Labor and Industries, North 1322 Post Street, Spokane, Washington 99207.

[Order 72-13, § 296-133-090, filed 7/31/72.]

WAC 296-133-100 Contents of petition—General. Petitions for the certification, decertification, or amendment of certification of an employee representative of a bargaining unit shall contain the following:

(1) A statement as to whether the petition is filed by a health care activities employee organization, a health care activities employee or a health care activities employer.

[Order 72-13, § 296-133-100, filed 7/31/72.]

WAC 296-133-110 Contents of petition filed by employee or employee organization. Petitions for certification decertification or amendment of certification filed by a

health care activities employee organization or a health care activities employees, shall contain:

(1) A description of the bargaining unit which the petitioner claims to be appropriate, a statement as to whether there is any disagreement between the petitioner and interested parties as to the nature and scope of the proposed bargaining unit; and statement that the petitioner is authorized to represent at least thirty percent of the employees within the proposed bargaining unit.

(2) The names and addresses of any persons or employee organizations, known to the petitioner, who claim to represent any employees in the proposed appropriate bargaining unit; the expiration dates and brief descriptions of any collective bargaining agreements which may be in effect between an employer and an employee organization covering all or a portion of the employees in the proposed bargaining unit.

(3) The number and job titles of the employees in the proposed bargaining unit.

(4) A statement that the employer declines to recognize the petitioner as the employee representative, or that the health care activities employer is about to recognize another employee organization as the exclusive bargaining representative or the presently recognized or certified employee organization is no longer the representative of the employees in the proposed bargaining unit.

(5) The name, affiliation, if any, and the address of the petitioner.

(6) Whether a work stoppage or picketing is in progress at the health care activity and, if so, the approximate number of employees participating and the date that such work stoppage or picketing commenced.

(7) Any other relevant factual information.

(8) A specific statement of the relief or remedy that the petitioner seeks the department to invoke.

[Order 72-13, § 296-133-110, filed 7/31/72.]

WAC 296-133-120 Contents of petition filed by employer. Petitions for certification or amendment of certification of a bargaining representative filed by a health care activities employer, shall contain:

(1) A factual statement setting forth that one or more individuals or employee organizations has presented to the petitioner a claim to be recognized as the exclusive bargaining representative of all employees in a bargaining unit claimed to be appropriate; the job titles of the employees of such bargaining unit; the number of employees in such unit; and a statement of reasons as to whether the petitioner agrees or disagrees as to the nature or scope of such requested bargaining unit.

(2) The name or names, affiliation, if any, and addresses of individuals or employee organizations known to the petitioner making such claim for recognition as to the exclusive bargaining representative of employees in the health care activity.

(3) A statement regarding whether the petitioner has contracts with any employee organization or other representatives of employees, and if so, the expiration dates of such agreements.

(4) A statement as to whether or not a work stoppage or picketing is in progress at the health care activity involved,

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and if so, the approximate number of employees participating, and the date such work stoppage or picketing commenced.

(5) A statement of other relevant facts.

(6) A statement regarding the remedy or relief the petitioner requests the department to invoke.

[Order 72-13, § 296-133-120, filed 7/31/72.]

WAC 296-133-130 Intervention. Any third party having a legitimate interest in any proceedings commenced under the act may file a petition seeking intervention in such proceedings setting forth facts sufficient to establish such interests and setting forth in such petition the remedy or relief the petitioner seeks the department to invoke.

For the purposes of third party intervention, "legitimate interest" means that the petitioner must allege in the petition for intervention and be prepared to prove if requested that it is authorized to represent at least thirty percent of the employees within a proposed bargaining unit before leave to intervene may be granted. Any employee organization which has a signed, valid collective bargaining agreement encompassing the proposed bargaining unit or any portion thereof shall be considered to have a legitimate interest upon presentation to the department of an executed authentic copy of such collective bargaining agreement.

[Order 72-13, § 296-133-130, filed 7/31/72.]

WAC 296-133-140 Conferences—Notice of hearing. Upon the filing of petition for certification, decertification or amendment of certification of an exclusive bargaining representative of employees and the determination of an appropriate bargaining unit, an authorized agent shall confer with and may hold informal conferences with the known interested parties in an effort to ascertain the agreed upon facts of the controversy. The authorized agent shall encourage the parties to agree upon an appropriate bargaining unit within the limitations of the act. Whenever the authorized agent shall determine that the parties are unable to agree upon an appropriate bargaining unit, and is unable to settle the controversy without hearing, a hearing shall be conducted. Notice of such hearing, with the time and place of such hearing, shall be given to all parties by mail at least six days prior to the date of hearing, excluding Saturdays, Sundays and legal holidays. Within a reasonable time following the determination of an appropriate bargaining unit, the authorized agent shall provide for a bargaining representation election in accordance with the provisions of section 3 of the act and as further provided in these rules.

[Order 72-13, § 296-133-140, filed 7/31/72.]

WAC 296-133-150 Petition—Amendments or withdrawals. At any time prior to the issuance of the written notice of a bargaining representation election, a petitioning party may, subject to the discretion of the authorized agent, amend or withdraw his petition.

[Order 72-13, § 296-133-150, filed 7/31/72.]

WAC 296-133-160 Unit determinations—Considerations. Whenever the department is called upon to make a determination of an appropriate bargaining unit within a

health care activity, within the limitations of the act, the department shall consider the duties, skills and working conditions of the health care activities employees; the history of collective bargaining by the health care activities employees and their bargaining representative within the proposed bargaining unit and in the health care industry; the extent of organization among the health care activities employees; the desires of such employees and the affect of the proposed bargaining unit upon the efficiency of administration of the health care activity.

[Order 72-13, § 296-133-160, filed 7/31/72.]

WAC 296-133-170 Representation questions—Timeliness. The department will not consider any question of representation within any bargaining unit or subdivision thereof in any health care activity within which in the preceding twelve-month period a valid election has been held. Nor will the department entertain any petition giving rise to the question of representation within any bargaining unit or portion thereof with a health care activity having a collective bargaining agreement in effect, except during the period not more than ninety nor less than sixty days prior to the expiration date of any such agreement. A collective bargaining agreement which contains a provision for automatic renewal or extension of the agreement or which is effective for a term of more than three years shall not be deemed to be a valid collection bargaining agreement for the purposes of this section.

[Order 72-13, § 296-133-170, filed 7/31/72.]

WAC 296-133-180 Employee lists. Health care activities employers shall furnish a current list of the names and addresses of all employees in a proposed or agreed upon bargaining unit prior to any scheduled representation hearing. The lists of such employees shall be available upon request to any organization which has been qualified under these rules and meeting the requirements of section 3 of the act.

[Order 72-13, § 296-133-180, filed 7/31/72.]

WAC 296-133-190 Authorization cards—Acceptability. In order to be acceptable as evidence of representation for the purposes of the thirty percent requirements of section 3 of the act, individual authorization cards must be signed and dated by the employee expressing his intention to be represented by a specific bargaining representative. A card signed and dated six months or more prior to the date on which examination of cards for representation purposes commences shall be considered invalid and not acceptable for representation purposes.

[Order 72-13, § 296-133-190, filed 7/31/72.]

WAC 296-133-200 Conduct of election. In the event a representation election is conducted for the purposes of certification, the following rules shall apply:

(1) Notice of election shall be given to all interested parties, and shall be prominently posted by the employer at a place or places within the health care services facility reasonably accessible to all employees. Notices of election shall be sent by mail to all interested parties no less than ten days prior to the date of the election excluding Saturdays,

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Sundays and legal holidays. Notices of election shall contain the following information; the date of election, hours and place of election, a list of employees eligible to vote, a description of the bargaining unit and a listing of employee organizations from which eligible employees may choose by ballot as well as a choice that such employees do not wish to be represented by any bargaining representative.

(2) Employee shall be deemed eligible to vote in an election for the certification of an exclusive bargaining representative of the employees of an appropriate bargaining unit who are regularly employed within the bargaining unit, either full or part time, and who are in the employ of the employer within fourteen days prior to the date of the issuance of the notice of election and on the date of election, except, supervisors as defined in section 2, subsection 5 of the act, and guards as defined in section 2, subsection 6 of the act, unless the bargaining unit is exclusively devoted to employees serving in the capacity of guards. Employees otherwise eligible to vote in a certification election may be permitted to vote by absentee ballot upon the filing of an affidavit with the authorized agent indicating that such person is eligible to vote in the certification election and that by reason of physical incapacity will be unable to be present at the balloting place on the date of election. The casting of ballots in a representation election by proxy will not be permitted.

(3) Each of the interested parties may designate one person as observer at the polls. Unless otherwise stipulated by the interested parties, observers must be nonsupervisory employees of the health care activities employer.

(4) Any observer, or the authorized agent, for good cause may challenge any employee's eligibility to vote. A challenged ballot shall be placed in an envelope bearing no identifying marks. It shall be placed in another envelope upon which shall be written the name of the employee desiring to cast a ballot, the reasons for which the ballot was challenged, by whom it was challenged, the polling place at which it was challenged, and the envelope shall be sealed and initialed by the authorized agent.

(5) The challenged ballots previously placed in separate envelopes shall be placed in a sealed envelope marked "challenged ballots" and sent along with the tally sheet to the authorized agent. The challenged ballots shall not be opened or counted unless the counting of such ballots might affect the results of the election. If the challenged ballots might affect the results of the election, the authorized agent shall conduct an investigation into and if requested conduct a formal hearing on the validity of the challenges made. If it is concluded that the challenge was properly made, that ballot shall be excluded from the count. Otherwise, such ballot shall be counted as cast.

(6) Ballots may not be tallied until after the time for the closing of the polls unless all eligible voters have cast their ballot.

(7) Within five days after the tally of the ballots has been furnished, any party may file with the authorized agent an original and three copies of objections to the conduct of the election, or conduct affecting the results of the election, which shall contain a short factual statement of the reasons for the objections. Such filing must be timely, whether or not the challenged ballots are sufficient in number to affect the results of the election. Copies of such objections shall

immediately be served by mail upon the other parties by the party filing them. If objections are filed to the conduct of the election, or conduct affecting the result of the election, the authorized agent shall investigate such objections. If the objections to the conduct of the election were sustained and the objections would affect the results of the election, the authorized agent, if requested by one of the interested parties, shall conduct a formal hearing.

[Order 72-13, § 296-133-200, filed 7/31/72.]

WAC 296-133-210 Run-off election procedure.

Where more than one employee organization is on the ballot, and neither of the three or more choices receives votes from a majority of the votes cast in the election, a run-off election shall be held. The run-off ballot shall contain the two choices which receive the largest and second largest number of votes.

[Order 72-13, § 296-133-210, filed 7/31/72.]

WAC 296-133-220 Certification. If no timely objections are filed, the authorized agent will certify, as an exclusive bargaining representative, the employee organization which receives votes from a majority of the employees who vote in the election or any run-off election or will certify that no employee organization receive votes from a majority of the employees who voted in the election or any run-off election. A copy of such certification shall be mailed to all interested parties within ten days of certification, along with a certification of the results of the election.

[Order 72-13, § 296-133-220, filed 7/31/72.]

WAC 296-133-230 Unfair labor practices—Who may file. Any employee or employee organization or a health care activities employer may file in writing an unfair labor practice charge with the department of labor and industries, alleging an unfair labor practice as set forth in the applicable provisions of sections 4 and 5 of the act: *Provided*, That this section and other sections of these rules relating to unfair labor practice charges, shall not be construed to prohibit an employee, an employee organization or an employer from instituting court proceedings as authorized under section 7 of the act without first having exhausted the remedies provided by these rules, except, in those cases in which an employee, an employee organization or an employer requests the director of labor and industries to exercise the authority invested in him to institute court proceedings to seek relief from the commission of an unfair labor practice. Any decision by a court rendered upon the merits of an unfair labor practice charge pursuant to a legal action instituted under the authority of section 7 shall be deemed res judicata and a bar to maintaining proceedings under this section and other sections of these rules relating to unfair labor practice charges.

[Order 72-13, § 296-133-230, filed 7/31/72.]

WAC 296-133-240 Filing of charges. Unfair labor practice charges shall be filed on such form or forms provided by the department and shall contain the following:

- (1) The name and address of the health care activities employer.

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- (2) The name and address of the person or organization who is filing the charges.

- (3) The statement as to the basis of the charge which shall be specific as to facts, names, addresses, dates and places.

- (4) A statement as to whether or not the complainant has instituted legal proceedings under the authority of section 7 of the act seeking relief from the alleged commission of an unfair labor practice.

- (5) The unfair labor practice charges shall be verified under oath in substantially the following form:

....., being first sworn on oath, deposes and says: That he is the complainant named in the foregoing unfair labor practice charges, that he has read the unfair labor practice charges, knows the contents thereof and believes the same to be true and correct to the best of his knowledge and belief.

.....
(Signature of Complainant)

Subscribed and sworn to before me on this
.... day of 1972.

.....
Notary Public in and for the
State of Washington, Resid-
ing at

[Order 72-13, § 296-133-240, filed 7/31/72.]

WAC 296-133-250 Actionable charges—Dismissals.

Upon receipt of an unfair labor practice charge, the department shall determine whether or not the complainant has alleged actionable charges of unfair labor practices under the provisions of the act. If the department finds that actionable charges have been alleged by the complainant, the department may give notice of not less than three days to the parties to the controversy that an informal hearing conference will be held at which conference testimony and evidence will be taken under oath to determine whether such charges are factually meritorious or frivolous. If the charges are found to be actionable charges and the evidence obtained at the informal hearing conference discloses that the charges are made in good faith and give rise to substantial questions of fact or law, the department shall issue a complaint and schedule the matter for hearing. If the informal hearing conference discloses that the unfair labor practice charges are frivolous and not made in good faith and do not give rise to substantial questions of fact or law, the unfair labor practice charges shall be dismissed and those persons or organizations named in such charges shall be notified in writing of such dismissal and the reasons for the dismissal. If the department finds that actionable charges have not been alleged under the provisions of the act, the unfair labor practice charges shall be dismissed and those persons or organizations named in such charges shall be notified in writing of such dismissal and the reasons for the dismissal.

[Order 72-13, § 296-133-250, filed 7/31/72.]

WAC 296-133-260 Remedial orders. Remedial orders may be issued by the department which shall afford an appropriate remedy or relief consistent with the provisions

of the act and the findings and conclusions of the authorized agent, which may include the prominent posting of such remedial orders within the health care activity at such place or places reasonably accessible to all employees for periods of time not to exceed six months.

[Order 72-13, § 296-133-260, filed 7/31/72.]

WAC 296-133-270 Extensions of time. Whenever in these rules provision is made for the conducting of a hearing by the authorized agent for the purpose of taking testimony and evidence after the giving of a notice of the time and place of such hearing, the authorized agent may upon his own motion change the time for such hearing to a later date and change the place for such hearing. In addition, any party to the hearing process may upon written application to the authorized agent upon the basis of good cause shown in such application be granted an extension of time and a change of the date or place or both for such hearing which is reasonably convenient to the parties.

[Order 72-13, § 296-133-270, filed 7/31/72.]

WAC 296-133-280 Impasse-determination. Whenever either a health care activities employer or the exclusive bargaining representative of the bargaining unit of such health care activity are of the opinion that an impasse has arisen between the parties in the process of collective bargaining, either party may request the department in writing to determine whether an impasse exists in the collective bargaining process.

For the purpose of these rules and supplementary to section 9 of the act, an impasse in the collective bargaining process will be presumed to have been reached when the parties have not agreed upon a collective bargaining contract and an issue or issues remain upon which neither party is willing to agree, nor make in good faith concessions or make further concessions in good faith, nor agree upon any good faith proposal nor make further proposals in good faith for the settlement of any issue remaining unresolved.

For the purpose of these rules and supplementary to the act, the terms "collective bargaining" means the performance of the mutual obligations of the employer and the bargaining representative of the employees to meet at reasonable times, to confer in good faith with respect to wages, hours and other terms and conditions of employment, or the negotiations of an agreement, or any question arising thereunder, and the execution of a written contract incorporating any agreement reached, but such obligation does not compel either party to agree to a proposal or require the making of a concession.

In any case in which the department is requested to determine whether an impasse has been reached in the collective bargaining process, the authorized agent shall request the parties representing the employer, and the parties representing the exclusive bargaining representative in the negotiations to meet and confer with the authorized agent for the purpose of an informal hearing conference to enable a determination of the facts to be made as to whether an impasse has been reached in the collective bargaining process. For that purpose the authorized agent may take evidence and testimony under oath. If the authorized agent determines that an impasse has been reached in the collective

bargaining process, he shall forthwith enter findings and conclusions forming the basis of his belief that an impasse has been reached and setting forth therein the specific issues remaining unresolved between the parties which constitute the impasse accompanied by an order declaring an impasse and ordering the parties to forthwith choose and impanel a board of arbitrators pursuant to the provisions of section 9 of the act. Which order shall further require the parties to furnish copies of the authorized agent's findings and conclusions and order declaring an impasse to each member of the panel of arbitrators for their guidance upon the subject of the issues remaining unresolved constituting the impasse.

If an impasse is found not to have been reached in the process of collective bargaining, the authorized agent shall enter findings and conclusions and order the parties to resume the process of collective bargaining.

[Order 72-13, § 296-133-280, filed 7/31/72.]

WAC 296-133-290 Administrative appeals to the director. Any employer or employee of a health care activity or employee organization or other person or organization who was a party in the proceeding before the authorized agent and aggrieved by any action taken or decision made by any authorized agent may appeal such action or decision to the director of the department of labor and industries by filing a notice of such appeal with the director of the department of labor and industries and the authorized agent within thirty days of such action or decision. The notice of appeal shall be accompanied by a concise numbered statement of the assignments of error which are to be relied upon and are the subject of the appeal. Copies of the notice of appeal and assignments of error shall be served upon all parties to the proceeding before the authorized agent. Proof of such service shall be filed in the office of the director. The notice of appeal may in the discretion of the director suspend such action or decision of the authorized agent pending the determination of the appeal by the director. The director shall review the record and written briefs on appeal filed by the respective parties and may bear oral argument regarding the issues on appeal. The director shall decide the issues raised by the appeal and shall notify all parties in writing of his decision. The decision of the director in the absence of an appeal to the superior court pursuant to the Administrative Procedure Act shall be final at the expiration of thirty days from the date of filing of such decision.

[Order 72-13, § 296-133-290, filed 7/31/72.]

WAC 296-133-300 Appeal briefs. Typewritten memoranda of authority or appeal briefs shall be filed in the office of the director by the respective parties to the appeal thirty days following the filing of the notice of appeal. Any party to the appeal filing an appeal brief may request that a hearing of oral arguments upon the appeal be held before the director. Parties to the appeal not filing an appeal brief will not be granted oral hearing of arguments before the director nor permitted to present oral arguments to the director at any hearing that may be held for the presentation of arguments on appeal. The time and place for hearing oral arguments, when requested, will be fixed at the expiration of the time

for filing briefs and notice of any such hearing will be sent to all parties to the appeal.

[Order 72-13, § 296-133-300, filed 7/31/72.]

WAC 296-133-310 Appeal briefs—Contents. In addition to the cover or title pages of the brief and any index, appeal briefs shall consist of the following subdivisions, titled with distinctive type and in the order indicated:

(1) Statement of the case. Under this heading the following shall be included: A brief statement of the nature of the case which is the subject of the appeal and a clear and concise statement of the facts appropriate to an understanding of the nature of the controversy, with page references to the record on appeal.

(2) Assignments of error. Each error relied upon and served with the notice of appeal shall be clearly pointed out and discussed under the appropriately designed headings. No alleged error of the authorized agent will be considered unless the same be definitely pointed out in the assignments of error in the appellant's brief. Whenever error is assigned to any findings of fact or conclusion of the authorized agent, so much of the findings or conclusions claimed to be erroneous shall be set out verbatim in the brief.

(3) Argument of counsel for appellant shall set forth and discuss the authorities in support of the position of the appellant and shall be appropriately designed and arranged for discussion and argument of the assignments of error and the issues arising out of such assignments of error with references where appropriate to the record on appeal.

(4) Argument of counsel for respondent. The brief of respondent on appeal need not contain a subdivision containing the assignments of error on appeal, but in the argument of counsel for respondent there shall be directed, under appropriately titled sections, argument and discussion in opposition to the assignments of error of the appellant, or in support of the decision of rulings of the authorized agent and where appropriate with supporting references to the pages of the record on appeal.

[Order 72-13, § 296-133-310, filed 7/31/72.]

WAC 296-133-320 Record on appeal. Upon receipt of a copy of the notice of appeal, the authorized agent shall promptly cause to be prepared and forwarded to the office of the director the record on appeal which shall include, a transcript of the proceedings of any hearing held by the authorized agent, the originals of all exhibits or documentary evidence admitted in evidence or rejected in evidence by the authorized agent and any other papers or evidence before the authorized agent relied upon in arriving at his decision. All exhibits shall be appropriately and plainly marked for reference. In addition the authorized agent shall certify in the appropriately titled case the record on appeal as containing all of the evidence, matters and things coming before the authorized agent at the hearing, or relied upon in making his findings, conclusions, decision and any remedial order. A copy of the record on appeal, or any portion thereof, may be obtained by any party to the appeal upon payment to the authorized agent of the reasonable cost per page.

[Order 72-13, § 296-133-320, filed 7/31/72.]

Chapter 296-134 WAC FAMILY LEAVE

WAC

296-134-001	Declaration of purpose.
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WAC 296-134-001 Declaration of purpose. It is in the public interest that employers provide reasonable leave upon the birth or adoption of a child or to allow for the care of a child under eighteen years old with a terminal health condition. This chapter serves to implement chapter 11, Laws of 1989 1st ex. sess., establishing a minimum standard for employee leave in furtherance of family stability and economic security.

These rules are not comprehensive and should be implemented in conjunction with the statutory requirements of chapter 49.78 RCW.

[Statutory Authority: 1989 1st ex. s. c 11. 89-23-044, § 296-134-001, filed 11/13/89, effective 12/14/89.]

WAC 296-134-010 Definitions. For the purposes of this chapter:

(1) "Chapter" means this chapter of the Washington Administrative Code or chapter 11, Laws of 1989 1st ex. sess.

(2) "Department" means the department of labor and industries.

(3) "Employee" means a person, other than an independent contractor, employed by an employer on a continuous basis for the previous fifty-two weeks for at least an average of thirty-five hours a week. In computing the average number of hours worked, hours over fifty hours a week shall not be included.

A person is employed on a continuous basis despite a temporary interruption in the performance of the person's job duties if (a) the interruption is caused by the employee taking authorized leave; (b) the interruption is caused by the employer's temporary cessation of all or most operations and the employees do not qualify for unemployment compensation benefits due to a continuing employment relationship, e.g., school employees; or (c) the employee qualified for unemployment compensation benefits as a "stand-by" worker as defined in WAC 192-12-150 for time periods of two weeks or less.

(4) "Employer" means any person, firm, corporation, partnership, business trust, legal representative, or other business entity which engages in any business, industry, profession, or activity in this state, and any unit of local government, which (a) employed a daily average on one hundred or more employees during the last calendar quarter at the place where the employee requesting leave reports for work, or (b) employed a daily average of one hundred or more employees within a twenty mile radius of the place where the employee requesting leave reports for work, the

employer maintains a central hiring location and customarily transfers employees among workplaces.

Any employer that has demonstrated the ability to transfer employees between workplaces within the twenty mile radius for the purpose of covering a temporary labor shortage or a permanent or temporary reassignment is considered to be an employer that customarily transfers employees.

A "central hiring location" is an office of the employer or its agent where two or more of the following functions are performed for two or more workplaces:

- (i) Employment applications are accepted or screened;
- (ii) Preemployment or employment interviews are conducted;
- (iii) Hiring decisions are made.

"Employer" also includes the state, state institutions, and state agencies.

(5) "Infraction" means a violation of chapter 11, Laws of 1989 1st ex. sess. or this chapter, as found by the department.

(6) "Workweek" means a fixed and regularly recurring period of one hundred sixty-eight hours or seven consecutive twenty-four hour periods. It may begin on any day of the week and any hour of the day, and need not coincide with a calendar week.

[Statutory Authority: 1989 1st ex.s. c 11. 89-23-044, § 296-134-010, filed 11/13/89, effective 12/14/89.]

WAC 296-134-030 Entitlement to leave. (1) Subject to restrictions within the statute and these rules, an employee is entitled to twelve workweeks of family leave during any twenty-four month period. Use of family leave shall not preclude an employee from using other leave to which the employee is entitled during that period according to the terms of the appropriate collective bargaining agreement or employer leave policy.

(2) Employers may limit or deny family leave to designated key personnel or the highest paid ten percent of the employer's employees in the state.

(a) Designated key personnel may not exceed ten percent of the employer's employees in the state. Key personnel shall be designated based upon criteria determined by the employer which may not include the employee's age or gender or other criteria for the purpose of evading the requirements of this chapter. Any designation of key personnel shall take effect thirty days after the employee is notified.

(b) If the employer chooses to limit or deny family leave to the highest paid ten percent of the employer's employees within the state, the employer shall within forty-five days after a determination notify the employees who fall within the highest paid ten percent. In calculating the highest paid ten percent of the employer's employees within the state, the employer shall include total wages, salary, or bonuses paid. An employer may not limit or deny family leave to the highest paid ten percent of the employer's employees until thirty days after the employees are notified. The notice shall be good for up to one year regardless of changes in compensation and may be changed no more than once in any twelve-month period.

[Statutory Authority: 1989 1st ex.s. c 11. 89-23-044, § 296-134-030, filed 11/13/89, effective 12/14/89.]

WAC 296-134-040 Notice. (1) An employee planning to take family leave to care for a newborn or newly adopted child shall provide the employer with written notice at least thirty days in advance of the anticipated date of delivery or adoption, stating the dates during which the employee intends to take family leave. This notice is not intended to substitute for notice to take maternity disability leave which an employer may require.

(2) Failure of an employee to provide written notice of the intention to take family leave for any authorized reason shall allow an employer to increase or reduce the leave requested by up to three weeks.

[Statutory Authority: 1989 1st ex.s. c 11. 89-23-044, § 296-134-040, filed 11/13/89, effective 12/14/89.]

WAC 296-134-050 Medical confirmation. An employer seeking confirmation by an employee's health care provider regarding the date of a child's birth, the date on which incapacity or disability commenced or will probably commence and its probable duration, or the fact that a child has a terminal health condition, shall notify the employee within seven calendar days or five working days of receipt of the employee's notice of leave except where the employer requires medical confirmation as part of the initial leave request. If disputes arise regarding premature birth, incapacitation of the mother, maternity disability, or the terminal condition of a child, the opinions of additional health care providers shall be obtained within fourteen calendar days or ten working days of the employer's receipt of the opinion of the employee's health care provider except where the employee is unable to schedule an appointment or otherwise fails to cooperate or where the employee's doctor is responsible for the delay.

[Statutory Authority: 1989 1st ex.s. c 11. 89-23-044, § 296-134-050, filed 11/13/89, effective 12/14/89.]

WAC 296-134-060 Leave from same employer. When both parents of a child are employed by the same employer, the employer may limit the family leave to a total of twelve workweeks during a twenty-four month period. For purposes of this section, an "employer" is the same entity as that defined in WAC 296-134-010(4) for determining the scope of this chapter. Each state agency or institution shall be considered a separate employer.

[Statutory Authority: 1989 1st ex.s. c 11. 89-23-044, § 296-134-060, filed 11/13/89, effective 12/14/89.]

WAC 296-134-070 Returning to employment. (1) Subject to the exceptions in subsections (2) and (3) of this section, an employee who exercises any right to family leave under this chapter shall be entitled, upon return from leave or during any reduced leave schedule, to the same position, with the same pay, benefits, hours and shift, as held when the leave commenced, or to a position with equivalent benefits and pay at a workplace within twenty miles of the employee's workplace when leave commenced. Upon a written request of the employee, the employer shall provide

a written explanation to the employee if the employee is not allowed to return to the same position.

(2) If the employer's circumstances have changed so that the employee cannot be reinstated to the same position or to a position with equivalent pay and benefits, an employee returning from family leave shall be reinstated in any position which is vacant and for which the employee meets the minimum qualifications. The filling of a position held by an employee on family leave does not by itself constitute changed circumstances.

(3) Reinstatement of an employee returning from family leave need not occur as provided under subsection (1) or (2) of this section if:

(a) The specific job is eliminated by a bona fide restructuring, or a reduction-in-force resulting from lack of funds or lack of work;

(b) The employee's workplace is completely shut down at the time for at least thirty days;

(c) The employer moves the workplace of the employee to a location at least sixty miles from the location of the workplace with leave commenced;

(d) An employee on family leave takes a position with another employer outside the home; or

(e) The employee fails to provide the required notice of intent to take family leave or fails to return on the established ending date of leave.

[Statutory Authority: 1989 1st ex.s. c 11. 89-23-044, § 296-134-070, filed 11/13/89, effective 12/14/89.]

WAC 296-134-090 Penalties. (1) The department may fine an employer up to two hundred dollars for the first infraction of this chapter or its enabling legislation.

(2) An employer that commits three or more infractions within a two-year period shall be considered an employer that continues to violate the statute, subject to a fine of up to one thousand dollars for each infraction. An infraction that affects more than one employee and that an employer refuses to correct within a reasonable time after notification by the department, such as the employer's refusal to display in a conspicuous place a poster informing employees of their rights under this chapter, shall also constitute a continuing violation, subject to a fine of up to one thousand dollars for each day the infraction continues.

[Statutory Authority: 1989 1st ex.s. c 11. 89-23-044, § 296-134-090, filed 11/13/89, effective 12/14/89.]

Chapter 296-150C WAC COMMERCIAL COACHES

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- 296-150C-1660 Chassis approval.

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COMMERCIAL COACH FEES

296-150C-3000	Commercial coach fees.
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WAC 296-150C-0010 Authority, purpose, and scope. (1) This chapter is authorized by RCW 43.22.340 through 43.22.435 covering the construction, alteration and approval of commercial coaches sold, leased, or used in Washington state.

(2) This chapter applies to the approval of commercial coach manufacturers, dealers and to any person who manufactures or alters the plumbing, mechanical, or electrical system or the body or frame of a commercial coach.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0010, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0020 What definitions apply to this chapter? "Alteration" is the replacement, addition, modification, or removal of any equipment or installation that affects the construction, fire and life safety, or the plumbing, mechanical, and electrical systems of a commercial coach.

The following are not considered alterations:

- Repairs with approved parts;
- Modification of a fuel-burning appliance according to the listing agency's specifications; or
- Adjustment and maintenance of equipment.

"Approved" is approved by the department of labor and industries.

"Building site" is a tract, parcel, or subdivision of land on which a commercial coach will be installed.

"Consumer" is a person or organization, excluding a manufacturer or dealer of commercial coaches, who buys or leases a commercial coach.

"Commercial coach" is a structure (referred to as a unit) that:

- Can be transported in one or more sections;
- Is used for temporary commercial purposes;
- Is built on a permanent chassis;
- Conforms to the construction standards of this chapter;
- May include plumbing, mechanical, electrical and other systems; and
- Includes Type A and Type B vendor units.

Type A vendor unit is a commercial coach vehicle such as, but not limited to, a truck, van, or step van. The maximum dimensions of a Type A vendor unit are 8 feet wide by 24 feet long in the set-up mode.

Type B vendor unit is a commercial coach structure such as, but not limited to, a recreational vehicle as defined by the American National Standards Institute, Inc. that is being

converted to a vendor unit. The maximum dimensions of a Type B vendor unit are 8 feet wide by 24 feet long in the set-up mode.

Note: A commercial coach may not be used as a single-family dwelling. A commercial coach does not have to be placed on a permanent foundation.

"Damaged in transit" means damage that affects the integrity of a structural design or any of the systems.

"Dealer" is a person, company, or corporation whose business is leasing, selling, offering for lease or sale, buying, or trading commercial coaches.

"Department" is the department of labor and industries. The department may be referred to as "we" or "us" in this chapter. Note: You may contact us at: Department of Labor and Industries, Specialty Compliance, PO Box 44440, Olympia, WA 98504-4440.

"Design plan" is a plan for the construction or alteration of a commercial coach or conversion of a vehicle to a commercial coach including floor plans, elevation drawings, specifications, engineering data, or test results necessary for a complete evaluation of the design.

"Design option" is a design that a manufacturer may use as an option to its commercial coach design plan.

"Equipment" is all material, appliances, devices, fixtures, fittings, or accessories used in the manufacture, assembly, conversion to, or alteration of a commercial coach.

"Factory assembled structure (FAS) advisory board" is a board authorized to advise the director of the department regarding the issues and adoption of rules relating to commercial coaches. (See RCW 43.22.420.)

"Insignia" is a label that we attach to a commercial coach to verify that the structure meets the requirements of this chapter and the applicable codes.

"Install" is to erect, construct, assemble, or set a commercial coach in place.

"Labeled" is to bear the department's insignia.

"Listed" is a piece of equipment or apparatus that has been approved by a testing agency to the appropriate standard.

"Local enforcement agency" is an agency of city or county government with power to enforce local regulations governing the installation of a commercial coach.

"Master design plan" is a design plan that expires when a new state building code has been adopted.

"One-year design plan" is a design plan that expires one year after approval or when a new state building code has been adopted.

"System" is part of a commercial coach designed to serve a particular function. Examples include structural, plumbing, electrical, or mechanical systems.

"Vendor unit" is a type of commercial coach (referred to as a unit) that:

- Is transported in only one section;
- Is designed for highway use;
- Is temporarily occupied for distribution of items (e.g., food);
- Is built on a permanent chassis;
- Includes at least one of the following systems: Plumbing, mechanical, or electrical;
- Is a converted structure, not a newly manufactured structure; and

- Is a Type A vendor unit or a Type B vendor unit.

Note: Newly manufactured units must comply with the commercial coach construction requirements of this chapter. Unoccupied vendor units are exempt from the requirements of this chapter. For example, those vehicles where food is sold and distributed by standing alongside it.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0020, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0030 How is this chapter enforced?

(1) To enforce this chapter, we or another governmental inspection agency will inspect each commercial coach manufactured, sold, leased, or used in Washington state as required by this chapter. (See WAC 296-150C-0070 - reciprocal agreements.)

(2) We will inspect all commercial coach alterations.

(3) We will conduct inspections during normal work hours or at other reasonable times.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0030, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0040 Will you keep my manufacturing information confidential? We will only release manufacturing information such as design plans, specifications, and test results according to the requirements of the Public Records Act. (See RCW 42.17.310 (1)(h).)

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0040, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0050 Can you prohibit the sale or lease of my commercial coach? (1) We may prohibit the sale or lease of your commercial coach because it is unlawful for any person to sell, lease, or offer for sale a commercial coach within this state if it violates any of the requirements of this chapter. (See RCW 43.22.345.)

(2) If an inspection reveals that a commercial coach violates this chapter, we may post a notice prohibiting the sale or lease of a commercial coach.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0050, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0060 Who handles consumer complaints about commercial coaches? (1) Consumer may file complaints within one year of the date of manufacture.

(2) The complaint should be in writing and describe the item(s) that may not comply with this chapter.

(3) After we receive the complaint, we will send the manufacturer and the dealer a copy of the complaint.

(4) The manufacturer and/or dealer have thirty days to respond. We shall base our actions on the response.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0060, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0070 Do you have reciprocal agreements with other states to inspect commercial coaches? (1) We have entered into reciprocal agreements

with states who have inspection standards equal or greater than our standard.

(2) When we have a reciprocal agreement with another state:

(a) The reciprocal state inspects the commercial coaches manufactured in that state before shipment into Washington to ensure compliance with our laws. After inspection, the reciprocal state applies our insignia.

(b) The department inspects commercial coaches manufactured in Washington before shipment into the reciprocal state to ensure compliance with their laws. After inspection, we apply the insignia of the reciprocal state.

(3) We have reciprocal agreements on file.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0070, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0080 Do you allow a local enforcement agency to inspect commercial coaches at the manufacturing location? (1) A local enforcement agency (city or county), under contract with us, can inspect commercial coaches. In some cases, their contract may be limited to specific portions of an inspection at specified manufacturing locations.

(2) After approving a unit, the local enforcement agency will attach the insignia, which indicates that the unit has passed inspection.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0080, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0100 What happens if I disagree with your decision regarding my compliance with this chapter? (1) If we determine that you are in violation of this chapter, you will receive a notice of noncompliance. (See WAC 296-150C-0560.)

(2) If you disagree with our decision, you can send us a written request for a hearing, stating why you disagree.

(3) After we receive your hearing request, we will:

(a) Schedule a hearing within thirty days after we receive your request.

(b) Notify you of the time, date, and place for the hearing. If you fail to appear, your case will be dismissed.

(c) Hear your case.

(d) Send you written notice of our decision.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0100, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0110 Do you have an advisory board to address commercial coach issues? The factory assembled structures (FAS) board advises us on issues relating to body and frame design, construction, alterations, plumbing, mechanical, electrical, installation, inspections, and rule adoption for commercial coaches. (See RCW 43.22.420.)

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0110, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0120 Where can I obtain technical assistance regarding commercial coaches? We offer field technical service to commercial coach manufacturers for an hourly fee. (See WAC 296-150C-3000.) Field technical service may include evaluation, consultation, plan examination, interpretation, and clarification of technical data relating to the application of our rules. It does not include inspections.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0120, filed 10/23/96, effective 11/25/96.]

INSIGNIA

WAC 296-150C-0200 Who must obtain commercial coach insignia? (1) You must obtain an insignia from us for each commercial coach manufactured, sold, leased, or used in Washington state.

(2) You do not need an insignia for a commercial coach:

(a) When a unit has been used outside of the state for six months before being brought into Washington state (see RCW 43.22.380); or

(b) If a unit was manufactured prior to July 1, 1968. (See RCW 43.22.370.)

Note: All commercial coaches must have insignia if they are altered, this includes the exceptions in subsection (1)(a) and (b) of this section.

(3) You must obtain an insignia when commercial coaches are altered in Washington state.

(4) You must obtain an alteration insignia when a commercial coach is damaged in transit after leaving the manufacturing location or during an on-site installation, and an alteration or repair is necessary. The insignia indicates the commercial coach was altered or repaired.

(5) You must have an approved design plan and pass our inspection before we will attach an insignia.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0200, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0210 What are the insignia requirements? (1) If you are applying for insignia, you must have your design plan approved and your commercial coach inspected and approved by us.

(2) If you are a manufacturer, dealer or owner applying for an alteration insignia, your alteration must be inspected and approved by us. Approval of the design plan may also be required.

(3) We will attach the insignia to your commercial coach after:

(a) We receive the required forms and fees from you (see WAC 296-150C-3000); and

(b) Your commercial coach has passed final inspection.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0210, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0220 How do I obtain insignia information and the required forms? Upon request, we

will provide you with a packet of information that includes the required forms.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0220, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0230 What are the insignia application requirements? (1) If you are requesting insignia for commercial coaches that you intend to manufacture under a *new design plan*, your completed application must include:

(a) A completed design-plan approval request form;

(b) One complete set of design plans, specifications, engineering analysis, and test procedures and results, plus one additional set for each manufacturing location where the design plan will be used.

(c) At least one set of design plans must have an original wet stamp from a professional engineer or architect licensed in Washington state. We will retain the set with the original wet stamp; and

(d) A one-time initial filing fee, the design-plan fee (if you want us to approve your design plan), and the fee for each insignia. (See WAC 296-150C-3000.)

(2) If you are requesting insignia under an *approved design plan*, your completed application must include:

(a) A completed insignia application form; and

(b) The fee for each commercial coach insignia (see WAC 296-150C-3000).

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0230, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0240 What documentation do you need to perform an alteration inspection? (1) If you alter a commercial coach, we must inspect the alteration.

(2) Before we perform an alteration inspection and attach an alteration insignia, you must send us:

(a) A description of the proposed alteration;

(b) Applicable specifications, engineering analysis, test procedures and results for design-plan review;

(c) The plan review fee (if you want us to approve your design plan);

(d) The inspection fee; and

(e) The insignia application and fee. (See WAC 296-150C-3000.)

(3) A design plan review is not required if the alteration can be made without altering any of the existing structure.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0240, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0250 How do I replace lost or damaged insignia? (1) If an insignia is lost or damaged after it is placed on a commercial coach, you may obtain a replacement insignia.

(2) You should contact us and provide the following information:

(a) Your name, address, and telephone number;

(b) The name of the manufacturer or person converting the vendor unit;

(c) The serial number;

(d) The manufacturer number (CC#) if available;

- (e) The insignia number if available; and
- (f) The required fee. (See WAC 296-150C-3000.)
- (3) If we can determine that your unit previously had an insignia, we will:

(a) Perform an inspection to ensure that no unauthorized remodeling has occurred;

Note: If unauthorized remodeling has occurred see WAC 296-150C-0200;

(b) Attach an insignia to your unit once we receive your insignia fee. (See WAC 296-150C-3000.)

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0250, filed 10/23/96, effective 11/25/96.]

DESIGN PLAN

WAC 296-150C-0300 When is design-plan approval required? Design plans for commercial coaches are required for units that are sold, leased, or used in Washington state and must be approved when:

- (1) You build a new unit;
- (2) You modify an approved design plan through addendums;
- (3) You add options to an approved design plan through addendums; or
- (4) You change the occupancy classification of the building.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0300, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0310 Who can approve design plans? (1) Design plans can be approved by us or by a licensed professional or firm authorized by us. (See WAC 296-150C-0420 and 296-150C-0430.)

(2) All electrical design plans for new or altered electrical installations for educational institutions, health care facilities, and other buildings (see chapters 296-46, 296-130, 296-140, and 296-150 WAC Table 1 or 2) must be reviewed and approved by us.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0310, filed 10/23/96, effective 11/25/96.]

DESIGN-PLAN APPROVAL BY THE DEPARTMENT

WAC 296-150C-0320 What must I provide with my request for commercial coach design-plan approval by the department? All requests for design-plan approval must include:

- (1) A completed design-plan approval request form;
- (2) Two sets of design plans plus elevation drawings, specifications, engineering analysis, and test results and procedures necessary for a complete evaluation of the design; (See WAC 296-150C-0340 and 296-150C-0350.)
- (3) At least one set of design plans must have an original wet stamp from a professional engineer or architect licensed in Washington state. We will retain the set with the original wet stamp;

(4) Receipt of a one-time initial design plan filing fee and the initial design plan fee (see WAC 296-150C-3000);

(5) A "key drawing" to show the arrangement of modules if the plan covers three or more modules;

(6) The occupancy class of the commercial coach according to the occupancy classifications in The Uniform Building Code.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0320, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0330 What must I provide with my request for a commercial coach vendor unit design-plan approval by the department? All requests for design-plan approval must include:

(1) A completed design-plan approval request form;

(2) Two sets of design plans, engineering analysis, or test results and procedures for a complete evaluation of the design plan; (See WAC 296-150C-0340 and 296-150C-0350.)

(3) An original wet stamp from a professional engineer or architect licensed in Washington state, if an engineering analysis is used to substantiate the structural requirements instead of test results; and

(4) Receipt of the design plan fee. (See WAC 296-150C-3000.)

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0330, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0340 What must an engineering analysis for design plans include? (1) The engineering analysis must show that the structural design meets the requirements of this chapter.

(2) An engineering analysis must be conducted according to accepted engineering practices and must be signed by a professional engineer or architect licensed in Washington. (See WAC 296-150C-3000.)

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0340, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0350 What must test procedures and results for design plans include? (1) Tests to a design must be witnessed by a professional engineer or architect licensed in Washington or by a departmental employee.

(2) Test reports must contain the following items:

(a) A description of the methods or standards that applied to the test;

- (b) Drawings and a description of the item tested;
- (c) A description of the test set-up;
- (d) The procedure used to verify the correct load;
- (e) The procedure used to measure each condition;
- (f) Test data, including applicable graphs and observations of the characteristics and behavior of the item tested; and

(g) Analysis, comments, and conclusion.

(3) The written test procedures and conclusions must reference the applicable design plan.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0350, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0380 What happens if you approve my design plan? (1) Your design plan will be approved if it meets the requirements of this chapter.

(2) We will send you an approved copy of the design plan with the design-plan approval number.

(3) You must keep copies of the approved design plan available for inspection at each location where the commercial coach is built.

(4) If your design plan is not approved, you will be notified in writing of plan deficiencies. You may send a corrected design plan to us. (See WAC 296-150C-3000.)

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0380, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0390 If my design plan is not approved, how much time do I have to submit a corrected design plan? (1) You have ninety days to correct and resubmit your original design plan and send us the resubmittal fee after we notify you of plan deficiencies. After ninety days, your initial design plan is returned to you.

(2) If you submit your corrected design plan after ninety days, the initial design plan fee is required instead of the resubmittal fee. (See WAC 296-150C-3000.)

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0390, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0400 What happens after my design plan is approved? Once your design plan is approved, we will inspect each commercial coach.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0400, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0410 When does my design plan expire? *Commercial Coach - Master Design Plan:*

(1) Your commercial coach master design plan expires when there is a code change. You must submit new design plans for approval when there is a state building code cycle change. You may use your approved master design plans to order insignia as long as they comply with the applicable codes.

Commercial Coach - One-Year Design Plan:

(2) Your commercial coach one-year design plan expires either one year after approval or when there is a code change. You must submit new design plans for approval when there is a state building code cycle change. You may use your design plans to order insignia as long as they comply with the applicable codes.

(3) All National Electrical Code amendments may be incorporated by an addendum to your design plan.

Note: The State Building Code is on a three-year code cycle which coincides with the State Building Code Council amendment cycle. The National Electrical Code (NEC) cycle, however, does not coincide with the other code cycles.

Commercial Coach Vendor Unit:

(4) Your vendor unit design plan expires after the unit is converted or altered. You can only use this design plan once.

(5) The effective date of this rule is November 25, 1996. Manufacturers who have approved design plans can continue production under the old rules for one hundred twenty days after the effective date of these rules. Manufacturers who are submitting new design plans after the effective date of these rules can submit and produce under the old rules for one hundred twenty days after the effective date of these rules.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0410, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0415 Who approves addendums to design plans approved by the department? You must have us approve an addendum to a design plan, if we initially approved your design plan.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0415, filed 10/23/96, effective 11/25/96.]

DESIGN-PLAN APPROVAL BY A LICENSED PROFESSIONAL OR FIRM

WAC 296-150C-0420 Who can be authorized to approve design plans? (1) A professional engineer, architect or firm licensed by the state of Washington according to the Engineers Registration Act, chapter 18.43 RCW and/or the Architects Registration Act, chapter 18.08 RCW; or

(2) A professional engineer, architect or firm licensed in another state that has licensing or certification requirements that meet or exceed Washington requirements.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0420, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0430 What information must a professional or firm provide to be authorized to approve design plans? (1) Name, a copy of your certificate of registration, and address of the professional engineer or architect; or

(2) Name, a copy of your certificate of authority, and address of the firm; and

(3) A description of the services the professional engineer, architect, or firm will provide; and

(4) A description of the professional's area(s) of expertise and qualifications which include:

(a) A summary of the professional's or firm's experience; and

(b) Verification of experience in your area of expertise such as structural, mechanical, plumbing, energy, electrical, fire and life safety, and ventilation and indoor air quality.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0430, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0440 How will I know whether I am authorized to approve design plans? Within sixty

days after you submit the information requested in WAC 296-150C-0430, we will send you a letter either approving or denying your authorization request.

(1) If we approve your request, your name is added to the list of licensed professionals and firms authorized to approve design plans.

(a) We will authorize a professional to approve portions of a design plan within his or her area of expertise; and

(b) We will authorize an engineering or architectural firm to approve plans if the firm employs or contracts with professionals within the area of expertise necessary for the design plan.

(2) If we do not approve your request, we will notify you in writing why we are denying your request for authorization. If you disagree with our decision, you can send us a written request for a hearing, stating why you disagree. (See WAC 296-150C-0100.)

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0440, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0450 How long is a licensed professional or firms authorization effective? Your authorization to approve design plans is effective until your license expires, is revoked or is suspended.

(1) You must notify us of your license renewal at least fifteen days before your license expires, to prevent your name from being removed from our licensed professional and firm list.

(2) You must notify us immediately if your license is revoked or suspended. Your name is then removed from the list of licensed professionals and firms authorized to approve design plans.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0450, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0460 What information must a manufacturer provide when a professional or firm does the design-plan approval? You must provide the following information with your approved design plans:

(1) A completed departmental design-plan approval request form;

(2) Two or more sets of design plans plus elevation drawings, specifications, engineering analysis, and test results and procedures necessary for a complete evaluation of the design. These design plans must have an original wet stamp, be signed, and dated by the approving professional(s) (see WAC 296-150C-0340 and 296-150C-0350);

(3) A cover sheet on the design plan noting which professional approved each portion of the design plan;

(4) A copy of the authorization letter from us; and

(5) The design plan fee for design plans approved by professionals or firms. (See WAC 296-150C-3000.)

(6) A professional who designs and certifies that the commercial coach design meets state requirements cannot also approve the design plan in the plan approval process.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0460, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0470 What happens after we receive the professional or firm approved design plan and information? (1) After we receive your approved design plans and information, we will review the information and assign a plan approval number. We will send a copy of the design plan with the plan approval number to the manufacturer.

(2) We may periodically audit design plans approved by a professional engineer, architect, or firm to ensure compliance with design plan requirements. The department's periodic audit should not be construed as certifying that the plans are safe.

(3) If the audit reveals that the design plans approved by the professionals and firms do not comply with this chapter, you will be notified and required to pay our fees for review and approval of the design plans. (See WAC 296-150C-3000.)

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0470, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0480 Do you have a list of professionals or firms that are authorized to approve design plans? We will maintain a list of the licensed professionals and firms that are authorized to approve design plans for commercial coaches.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0480, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0490 Who approves addendums to design plans approved by a professional or firm? (1) You must have the professional or firm approve an addendum to a design plan, if they initially approved your design plan.

(2) If the professional or firm who approved your design plan is no longer on the department list you may have us approve your addendum.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0490, filed 10/23/96, effective 11/25/96.]

INSPECTIONS PRIOR TO ISSUANCE OF AN INSIGNIA

WAC 296-150C-0500 When is an inspection required? (1) Before we issue an insignia, each unit manufactured or converted must be inspected as many times as required to show compliance with this chapter.

Note: Each commercial coach must have a serial number so we can track inspections.

(2) Before we issue an insignia, each commercial coach must be inspected at the manufacturing location as many times as required. Inspections may include but are not limited to:

(a) A "cover" inspection during construction of the unit before the electrical, plumbing, mechanical, and structural systems are covered;

(b) Insulation and vapor barrier inspection, if required; and

(c) A final inspection after the commercial coach is complete.

(3) If we discover a violation during inspection, we will issue a notice of noncompliance. You can correct the violation during the inspection. If you cannot correct the violation during inspection, you must leave the item uncovered until we approve your correction.

(4) If a commercial coach is damaged in transit to the building site or during on-site installation, it must be inspected. This is considered an alteration inspection. (See WAC 296-150C-0240.)

(5) Approved design plans, specifications, engineering analysis and test results must be available during the inspection.

(6) Once your unit is inspected and approved we will attach the insignia.

Commercial Coach Vendor Unit

(7) Before we issue an insignia, each commercial coach vendor unit is inspected as follows:

(a) Inspection(s) during conversion or alteration of a commercial coach vendor unit; and

(b) A final inspection after the commercial coach vendor unit is complete.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0500, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0510 How do I request an inspection? (1) You must contact us, and we will let you know where your request for inspection should be submitted. Our address is noted in the definition of department.

(2) We must receive in-state inspection requests at least seven calendar days prior to the date that you want the inspection.

(3) We must receive out-of-state inspection requests at least fourteen calendar days prior to the date that you want the inspection.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0510, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0520 What happens if my commercial coach passes inspection? If your commercial coach passes inspection and you have met the other requirements of this chapter, we will attach the insignia.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0520, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0530 Am I charged if I request an inspection but I am not prepared? (1) If you ask us to inspect a commercial coach within Washington state but you are not prepared when we arrive, you must pay the inspection fee and travel. (See WAC 296-150C-3000.)

(2) If you ask us to inspect a commercial coach outside Washington state but you are not prepared when we arrive, you must pay the inspection fee, travel, and per diem expenses. (See WAC 296-150C-3000.)

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0530, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0540 Who inspects commercial coach installation at the building site? The local enforcement agency (city or county) must approve the installation.

Note: The local enforcement agency may not open the concealed construction of a commercial coach to inspect it if our insignia is attached.

Note: Alterations to commercial coaches must be inspected and approved by us.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0540, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0550 Do you allow a commercial coach to be completed at the installation site? Commercial coaches must be completed at the manufacturing location before an insignia is attached.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0550, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0560 What happens if I receive a notice of noncompliance after inspection of the alteration to my commercial coach? (1) If your commercial coach alteration does not pass our inspection, you will receive a notice of noncompliance. The notice of noncompliance explains what items must be corrected.

(2) You have twenty days after receiving the notice of noncompliance to send us a written response to explain how you will correct the violations.

(3) You are not allowed to sell, lease, or offer for sale the altered commercial coach until you correct the violations. We must inspect and approve the corrections, and you must pay the inspection and insignia fees, if required (see WAC 296-150C-3000).

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0560, filed 10/23/96, effective 11/25/96.]

USED COMMERCIAL COACHES WITHOUT AN INSIGNIA

WAC 296-150C-0580 Must I obtain an insignia for used commercial coaches? All used commercial coaches that are to be installed on a building site or used in Washington state must have an insignia of approval from us. (See exceptions WAC 296-150C-0200 (1)(a)(b).)

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0580, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0590 How do I obtain insignia for used commercial coaches? We consider used commercial coaches as new units for purposes of insignia approval. To obtain insignia, you must:

(1) Have the design plan approved (see WAC 296-150C-0300 through 296-150C-0480);

(2) Purchase insignia (see WAC 296-150C-0200 through 296-150C-0230); and

(3) Pass a unit inspection (see WAC 296-150C-0500 through 296-150C-0560).

Note: You will be required to open up as much of the construction of the unit as is necessary for inspection to show compliance with your approved design plan.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0590, filed 10/23/96, effective 11/25/96.]

MANUFACTURER'S NOTICE TO THE DEPARTMENT

WAC 296-150C-0700 Must manufacturers of commercial coaches notify you if they manufacture at more than one location? (1) If you are manufacturing commercial coaches at more than one location, approved design plans must be available at each manufacturing location.

(2) You must send us the following information for each manufacturing location:

- (a) Company name;
 - (b) Mailing and physical address; and
 - (c) Phone and FAX number if available.
- (3) You must update this information as it changes.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0700, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0710 Must manufacturers of commercial coaches notify you of a change in business name or address? (1) If you are moving you must notify us in writing prior to a change of business name or address.

(2) Your notice must include the change of name and address.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0710, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0720 Must manufacturers of commercial coaches notify you of a change in business ownership? (1) When a manufacturer changes ownership, the new owner must notify us in writing immediately.

(2) A new owner may continue to manufacture the units according to a prior approved design plan if the prior owner provides written releases of the design plan.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0720, filed 10/23/96, effective 11/25/96.]

COMMERCIAL COACH CONSTRUCTION CODE

GENERAL

WAC 296-150C-0800 What manufacturing codes apply to commercial coaches? (1) All design, construction, and installations of commercial coaches must conform with the following codes and the requirements of this chapter:

(a) The Washington State Ventilation and Indoor Air Quality Code, 1991 third edition as adopted by chapter 51-13 WAC;

(b) The structural and other requirements of this chapter;

(c) Occupancy classification only from chapter 3 of The Uniform Building Code, 1994 edition as adopted and

amended by chapter 51-30 WAC, except commercial coaches must not be group H or R-3 occupancy;

(d) Accessibility requirements of chapter 11 of The Uniform Building Code, 1994 edition as adopted and amended by chapter 51-30 WAC;

(e) Table 16-A Uniform and concentrated floor loads and footnotes of The Uniform Building Code, 1994 edition as adopted and amended by chapter 51-30 WAC;

(f) The Uniform Mechanical Code, 1994 edition as adopted and amended by chapter 51-32 WAC except when conflicting with the provisions of this chapter, this chapter controls;

(g) The National Electrical Code as referenced in chapter 19.28 RCW and chapter 296-46 WAC;

(h) The Washington State Energy Code, 1994 second edition as adopted by chapter 51-11 WAC;

(i) The Uniform Plumbing Code, 1991 edition as adopted and amended by chapters 51-26 and 51-27 WAC.

(j) Where there is a conflict between codes, an earlier named code takes precedent over a later named code. Where, in any specific case, different sections of this code specify different materials, methods of construction or other requirements, the most restrictive governs. Where there is a conflict between a general requirement and a special requirement, the specific requirement must be applicable.

(2) All construction methods and installations must use accepted engineering practices, provide minimum health and safety to the occupants of commercial coaches and the public, and demonstrate journeyman quality of work of the various trades.

(3) Requirements for any size, weight, or quality of material modified by the terms "minimum," "not less than," "at least," and similar expressions are minimum standards. The manufacturer may exceed these rules provided the deviation does not result in inferior installation or defeat the purpose and intent of this chapter.

Note: The codes, RCW's and WAC's referenced in this rule are available to view at the Washington State Library, the Washington State Law Library, and may also be available at your local library.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0800, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0810 Construction definitions. The following definitions and the definitions in each of the state codes adopted in WAC 296-150C-0800 apply to commercial coach construction.

"**Anchoring system**" is the means used to secure a commercial coach to ground anchors or to other approved fastening devices. It may include straps, cables, turnbuckles, bolts, fasteners, or other components.

"**Ceiling height**" is the clear vertical distance from the finished floor to the finished ceiling.

"**Dead load**" is the vertical load resulting from the weight of all permanent structural and nonstructural parts of a commercial coach including walls, floors, roof, partitions, and fixed service equipment.

"**Diagonal tie**" is a tie intended primarily to resist horizontal or shear forces and secondarily may resist vertical, uplift, and overturning forces.

"**Dormitory**" is a room designed to be occupied by more than two persons.

"**Exit**" is a continuous and unobstructed means of egress to a public way.

"**Glazed opening**" is a glazed skylight or an exterior window or glazing of a door of a commercial coach.

"**Gross floor area**" is the net floor area within the enclosing walls of a room where the ceiling is at least five feet high.

"**Habitable room**" is a room or enclosed floor space arranged for living, eating, food preparation, or dormitory sleeping purposes. It does not include bathrooms, toilet compartments, foyers, hallways, or other accessory floor spaces. Any reference to "habitable dwelling" in this chapter means a temporary structure not used as a single family dwelling.

"**Interior finish**" is the surface material of walls, fixed or movable partitions, ceilings and other exposed interior surfaces affixed to the commercial coach structure, including paint and wallpaper. Decorations or furnishings attached to the commercial coach structure are considered part of the interior finish.

"**Live load**" is the weight superimposed by the use and occupancy of the commercial coach, including wind load and snow load, but not including dead load.

"**Perimeter blocking**" is support placed under exterior walls.

"**Shear wall**" is a wall designed and constructed to transfer lateral loads.

"**Tiedown**" is a device designed to anchor a commercial coach to ground anchors.

"**Use**" or "**occupancy classification**" is the designed purpose of a commercial coach according to The Uniform Building Code.

"**Wind load**" is the lateral or vertical pressure or uplift created by wind blowing in any direction.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0810, filed 10/23/96, effective 11/25/96.]

STRUCTURAL

WAC 296-150C-0820 Structural analysis. Each commercial coach must be designed and constructed as a completely integrated structure capable of sustaining the design-load requirements of this chapter. It shall be capable of:

(1) Transmitting these loads to stabilizing devices without causing unsafe deformation or abnormal structural movement; and

(2) Withstanding the adverse effects of transportation shock and vibration, both as an integrated structure and as to its parts.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0820, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0830 Fastening of structural systems. Roof framing must be securely fastened to wall framing, walls to floor structure, and floor structure to chassis. This must secure and maintain continuity between

the floor and chassis and resist wind uplift, overturning, and sliding as imposed by design loads.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0830, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0840 Live loads. (1) The design live loads must be established according to this chapter and must be considered to be uniformly distributed.

(2) The roof live load must not be considered as acting simultaneously with the wind load. The roof and the floor live loads must not be considered as resisting the overturning moment due to wind. The roof live load and the floor live load must be considered to act both simultaneously and separately in order to determine the critical design loading for stresses and deflections.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0840, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0850 Roof loads. All roofs must be designed to sustain loads as follows:

(1) Dead loads plus a minimum unit live load of 30 lb/ft² (2 months load duration); and

(2) A vertical net uplift load of 9 lb/ft² (1 day load duration).

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0850, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0860 Snow loads. The roof of a commercial coach must be designed for the loads to which it will be subjected in areas where snow records or experience indicate snow loads in excess of 30 lb/ft².

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0860, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0870 Standard wind loads. The commercial coach and each wind resisting part must be designed for the following wind loads:

Horizontal	15 lb/ft ²	(1 day load duration)
Vertical upward	9 lb/ft ²	(1 day load duration)
Vertical downward	(see WAC 296-150C-0850 Roof loads)	

A commercial coach must be designed for higher wind loads if area records or experience indicate that it will be subjected to wind loads in excess of the above loads if required by the local jurisdiction.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0870, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0880 Windstorm protection—Provisions for support and anchoring. (1) Each commercial coach must have provisions for support and anchoring systems that, when properly designed and installed, will resist overturning and lateral movement of the commercial coach as imposed by the respective design loads. Support and anchoring systems can be installed according to the Table in WAC 296-150C-1210 or designed by a professional engineer.

(2) The manufacturer of each commercial coach is required to make provision for the support and anchoring systems but is not required to provide the anchoring equipment or stabilizing devices.

(3) The manufacturer must provide printed instructions with each commercial coach specifying the location and required capacity of stabilizing devices on which the design is based.

Single-Wide Commercial Coaches:

(4) The provisions made for anchoring systems must be based on the following design criteria for single-wide commercial coaches:

(a) The minimum number of ties required per side is noted in WAC 296-150C-1210.

(b) Ties must be as evenly spaced as practicable along the length of the commercial coach. No more than eight feet open-end spacing must occur on each end.

(c) If continuous straps are provided as vertical ties, they must be positioned at rafters and studs. If a vertical tie and diagonal tie are located at the same place, both ties may be connected to a single ground anchor, as long as, the anchor used is capable of carrying both loads.

(d) Add-on sections of expandable commercial coaches must have provisions for vertical ties at the exposed ends.

Double-Wide Commercial Coaches:

(5) Double-wide commercial coaches require only diagonal ties specified in the table in WAC 296-150C-1210. The ties must be placed along the outer side walls.

(6) Protection must be provided at sharp corners where the anchoring system requires the use of external cables or straps. Protection must also be provided to minimize damage to roofing or siding by the cable or strap.

(7) Anchoring equipment must be capable of resisting an allowable working load equal to or exceeding 3,150 pounds and must be capable of withstanding a 50 percent overload (4,725 pounds total) without failure of either the anchoring equipment or the attachment point on the commercial coach.

(8) Exposed anchoring equipment must have a resistance to weather deterioration at least equal to that provided by a coating of zinc on steel of at least 0.30 ounces per square foot of surface coated.

(a) Slit or cut edges of zinc-coated steel strapping do not need to be zinc-coated.

(b) Type 1, Class B, Grade 1 steel strapping, 1 1/4 inches wide and 0.035 inch thick, conforming with Federal Specification QQ-S-781-G, meets the requirements of this paragraph.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0880, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0900 Interior walls and partitions. Interior walls and partitions must be:

(1) Constructed with structural capacity adequate for the intended purpose; and

(2) Capable of resisting a horizontal load of at least five pounds per square foot without exceeding the deflections specified in WAC 296-150C-0920.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0900, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0910 Minimum uniform and concentrated live loads. See use or occupancy of the 1994 edition of The Uniform Building Code for group occupancy loads.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0910, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0920 Design load deflection. When a structural assembly is subjected to total design live loads, the deflection for structural framing members must not exceed the following:

L = The clear span between supports or two times the length of a cantilever.

Floor	L/240
Roof and ceiling	L/180
Headers, beams, girders	L/180
Walls and partitions	L/180

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0920, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0930 Structural load tests. (1) A structural assembly or subassembly tested for qualification must sustain the design dead load plus the superimposed design live loads (see WAC 296-150C-0840) equal to 1.75 times the required live loads for a period of twelve hours without failure of the assembly or subassembly, unless otherwise specified in this chapter.

(2) An assembly or subassembly failure is defined as a rupture, fracture, or residual deflection which is greater than the limits set in WAC 296-150C-0920. The type and quality of material used in each test assembly or subassembly must be identified. The assembly or subassembly tested must represent the minimum quality of material.

(3)(a) Nationally recognized standards or engineering practices must be used for structural load tests for commercial coaches.

(b) Tests must be witnessed by a professional engineer or architect.

Note: We will provide test procedure forms upon request.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0930, filed 10/23/96, effective 11/25/96.]

CONSTRUCTION

WAC 296-150C-0940 Fastening of structural systems. Roof framing must be securely fastened to wall framing, walls to floor structure, and floor structure to chassis to secure and maintain continuity between the floor and chassis and to resist wind uplift, overturning, and sliding as imposed by design loads.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0940, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0950 Roof coverings/membrane/weather resistant. (1)(a) The roof covering must be securely fastened in an approved manner to the supporting roof construction and must provide weather protection for the commercial coach and the occupants. The roof covering must be installed according to the manufacturer's instructions and approved by us.

(b) Roofing membranes must be rigid enough to prevent deflection that would permit ponding of water or separation of seams due to snow or wind or during assembly or transportation.

(2) Exterior covering materials, including metal coverings, must be moisture and weather-resistant and contain corrosion resistant fasteners to prevent wind and rain deterioration.

Note: Electro-plated, electro-deposited zinc, and electro-galvanized staples are not considered corrosion resistant materials.

(3) All exterior openings or penetrations into the commercial coach around piping, ducts, plenums, or vents must be sealed with moisture resistant material.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0950, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0960 Roof trusses. (1) The construction of roof trusses must be approved by a professional engineer. Roof trusses may be produced by one of the following methods:

(a) Use of stress graded materials when an approved testing agency certifies truss construction and load requirements are met; the testing agency must prepare an approved quality control program which allows them to test the trusses with appropriate testing procedures.

(b) Use of nongraded materials, if each truss is tested in an approved testing jig at the manufacturer's site with a load equivalent to full design load (1.75 times the full design load sustained for twelve hours).

(2)(a) Representative trusses must be tested from the production line, when we request. The approved testing agency or engineer must submit the testing report to us.

(b) All test reports are to be stamped, signed, and dated by the approved testing agency or engineer who performs the test.

(c) These tests must not occur more than two times a year per design unless there are problems with the roof trusses.

(d) The manufacturer is required to maintain an acceptable quality level not exceeding 1% using acceptable sampling procedures.

Note: The acceptable quality level is defined as the maximum allowable percentage of defective units.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0960, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0970 Roof construction. (1) All roofs must be framed and tied into the framework and supporting walls to form an integral part of the commercial coach.

(2) All trusses must be laterally braced.

(3) All roof decks must be designed and built with sufficient slope or camber to assure adequate drainage, or must be designed to support maximum loads including possible ponding of water due to deflection.

(4) Cutting roof framework members for passage of electrical, plumbing, or mechanical systems is prohibited except where substantiated by engineering analysis.

(5) Electrical, plumbing, or mechanical systems must not penetrate the roofing membrane unless the penetration point is adequately sealed.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0970, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0980 Wall coverings. (1) The interior finish of all walls and partitions must have a flame-spread rating not exceeding two hundred except as otherwise specified in this section. The flame-spread limitation does not apply to:

(a) Molding, trim, windows, doors, or series of doors four feet wide or less;

(b) Permanently attached decorative items such as pictures or accent panels constituting not more than ten percent of the aggregate wall surface in any room or space or more than thirty-two square feet in surface area, whichever is less.

(2) Furnace and water heater spaces must be enclosed by walls, ceiling, and doors having an interior finish with a flame-spread rating not exceeding twenty-five.

(3) Combustible kitchen cabinet doors, countertops, exposed bottom and end panels must not exceed a flame-spread rating of twenty-five. Cabinet rails, stiles, mullions, and toe strips are exempted.

(4) Finish surfaces of plastic bath tubs, shower units and tub or shower doors must not exceed a flame-spread rating of two hundred.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0980, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-0990 Sealing wall exterior openings. All exterior wall openings or penetrations into the commercial coach around piping, ducts, plenums, or vents must be sealed with moisture-resistant material.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-0990, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1000 Drilling or notching of wood wall structural members. (1) **Cutting and notching.** In exterior walls and bearing partitions, any wood stud may be cut or notched to a depth not exceeding 25 percent of its width. Cutting or notching of studs to a depth not greater than 40 percent of the width of the stud is permitted in nonbearing partitions supporting no loads other than the weight of the partition.

(2) **Bored holes.** A hole not greater in diameter than 40 percent of the stud width may be bored in any wood stud. Bored holes not greater than 60 percent of the width of the stud are permitted in nonbearing partitions or in any wall where each bored stud is doubled, provided not more than two such successive doubled studs are so bored.

In no case shall the edge of the bored hole be nearer than 5/8 inch (16mm) to the edge of the stud. Bored holes shall not be located at the same section of stud as a cut or notch.

(3) Drilling or notching of studs greater than allowed in subsection (1) or (2) of this section must be substantiated by engineering analysis.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1000, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1020 Wall construction. Walls must be of sufficient strength to withstand the load requirements of this chapter. The connections between the bearing walls, floor, and roof framework members must be fabricated to provide support for the material used to enclose the commercial coach and to provide for the transfer of all lateral and vertical loads to the floor and the chassis.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1020, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1030 Fire-blocking. (1) Fire-blocking must be provided in commercial coaches to cut off all concealed draft openings in all stud walls and partitions, including furred spaces at the ceiling and floor levels and at ten foot intervals both vertical and horizontal.

(2) Fire-blocking must be provided around vents, pipes, ducts, chimneys, fireplaces, and similar openings which afford a passage for fire at ceiling and floor levels, with noncombustible material.

(3) Fire blocking must be two inch nominal lumber, gypsum board, cement asbestos board, mineral fiber or other approved materials securely fastened in place.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1030, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1040 Floors. (1) Wood floors or subfloors in kitchens, bathrooms (including toilet compartments), laundry rooms, water heater compartments, and any other areas subject to excessive moisture must be moisture resistant; or they must be made moisture resistant by sealing or by an overlay of nonabsorbent material applied with water-resistant adhesive.

(2) Carpeting cannot be used under a heat producing appliance unless the appliance is listed for such use.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1040, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1050 Drilling or notching of wood joist structural members. (1) Notches on the ends of joists must not exceed one-fourth the joist depth, unless substantiated by engineering design or approved tests.

(2) Holes bored in joists must not be within two inches of the top or bottom of the joist, and the diameter of any such hole must not exceed one-third of the depth of the joist.

(3) Notches in the top or bottom of the joists must not exceed one-sixth the depth and must not be located in the middle third of the span.

(4) Joists in transverse floor framing systems, which do not have perimeter blocking, must not be drilled or notched, unless substantiated by engineering design or approved tests.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1050, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1060 Fastening of structural systems. Roof framing must be securely fastened to wall framing, walls to floor structure, and floor structure to chassis to secure and maintain continuity between these elements to resist wind uplift, overturning and sliding imposed by the design loads.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1060, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1070 Floor closure material. Floor closure material around piping, ducts, plenums, or vents must prevent damage to the underside of the commercial coach due to air, water, insects, dust, and must be rodent resistant.

The closure material must meet ASTM D-781 standard or equal and be installed as follows:

(1) Fibrous material (with or without patches) must meet or exceed the level of 48 inch-pounds of puncture resistance as tested.

(2) The material must be installed according to installation instructions furnished by the supplier of the material.

(3) Patching material must be suitable for patches and the patch life must be equivalent to the material life.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1070, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1080 Chassis. Each commercial coach chassis must be designed and constructed to be capable of:

(1) Effectively sustaining the design loads consisting of the dead load plus the live load of the floor and the superimposed dynamic load resulting from highway movement, in no case shall the dynamic load be required to exceed twice the dead load; and

(2) Accepting the shock and vibration from the roadway and towing vehicle through the use of adequate running gear assemblies. Running gear assemblies consist of axles, springs, spring hangers, hubs, bearings, tires, rims and their related hardware. Running gear assemblies must be capable of sustaining the loads in subsection (1) of this section.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1080, filed 10/23/96, effective 11/25/96.]

MATERIALS

WAC 296-150C-1090 Standards for equipment and installations. The manufacturer's equipment and installation specifications must be followed. Other approved standards are acceptable when:

- Installed according to the manufacturer's installation instructions; and
- Approved by a listing or testing agency.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1090, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1100 Flame-spread limitations. (1) The interior finish of all walls and partitions must have a flame-spread rating not exceeding two hundred except as otherwise specified in this section. The flame-spread limitation does not apply to:

(a) Molding, trim, windows, doors, or series of doors four feet wide or less;

(b) Permanently attached decorative items such as pictures or accent panels constituting a maximum of ten percent of the aggregate wall surface in any room or space or more than thirty-two square feet in surface area, whichever is less.

(2) All ceiling interior finish must have a maximum flame-spread rating of two hundred, excluding molding and trim two inches wide or less.

(3) Furnace and water heater spaces must be enclosed by walls, ceiling, and doors having an interior finish with a maximum flame-spread of twenty-five.

(4) Combustible kitchen cabinet doors, countertops, exposed bottom and end panels must have a maximum flame-spread of twenty-five. Cabinet rails, stiles, mullions, and toe strips are exempted.

(5) Exposed interior finishes adjacent to the cooking range must have a flame-spread of fifty. Adjacent surfaces are the exposed vertical surfaces between the range top and the overhead cabinets or ceiling and within six horizontal inches of the cooking range.

(6) Finish surfaces of plastic bath tubs, shower units and tub or shower doors must have a flame-spread of two hundred.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1100, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1110 Combustible limitations. (1) The exposed wall adjacent to the cooking range, must be fifty flame-spread or less, such as 5/16 inch gypsum board or material having equivalent fire protective properties.

(2) All openings for pipes and vents in furnace and water heater spaces shall be tight-fitted or fire-stopped.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1110, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1120 Kitchen cabinet protection. The bottom and sides of combustible kitchen cabinets over cooking ranges or tops including a space of six inches from the edge of the burners must be protected with at least

materials rated at 25 or less flame-spread covered with at least twenty-six gauge sheet metal (.017 stainless steel, .024 aluminum or .020 copper) or equivalent protection. The protective metal over the range must form a hood with at least a three-inch eyebrow (measuring horizontally from face of cabinet). The hood must be centered over and at least as wide as the top of the cooking range.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1120, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1130 Insulation standards. Insulation standards for commercial coaches must comply with the Washington State Energy Code, unless another state law supersedes the Washington State Energy Code.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1130, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1140 Room sizes. (1) Every habitable room must have a minimum ceiling height of not less than seven feet.

(2) No habitable room, except a kitchen, must be less than five feet in any clear horizontal dimension.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1140, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1150 Hallways. (1) Hallways in structures required to meet accessibility standards must have a minimum horizontal dimension that conforms to accessibility standards set by the Washington state Uniform Building Code.

(2) Hallways in nonaccessible construction site trailers must have a minimum horizontal dimension of 32 inches.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1150, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1160 Accessibility standards. When applicable, a commercial coach must meet the accessibility standards set by the Washington State Building Code in RCW 19.27.030(5).

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1160, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1170 Light and ventilation. (1) Habitable rooms must be provided with exterior windows or doors having a total glazed area of at least ten percent of the floor area, or they must have artificial light.

(2) An area equal to a minimum of five percent of the floor area must be available for unobstructed ventilation. Glazed areas do not need to be opened if a mechanical ventilation system is provided. The mechanical ventilation system must be capable of producing a change of air in the room every thirty minutes with at least one-fifth of the air supply taken from outside the commercial coach.

(3) Each bathroom must be provided with artificial light and with external windows. The external window must have at least 1/2 square feet of glazed area fully able to open,

except where a mechanical ventilation system capable of producing a change of air every twelve minutes is provided. Any mechanical ventilation system must exhaust directly to the outside of the commercial coach.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1170, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1180 Commercial coach exits.

When applicable, a commercial coach must comply with Uniform Building Code, Chapter 11 Accessibility and with the following requirements:

(1) Commercial coaches must have at least two exterior doors that are remote from each other. Remote means that in:

(a) Single-wide units the doors may not be less than twelve feet apart; and

(b) Multi-wide units the doors may not be less than twenty feet apart, center to center from each other measured in a straight line direction regardless of the length of travel between doors.

Exception: A commercial coach that is twenty-four feet long or less needs only one exit door, unless it has a dormitory sleeping area.

(2) Exterior doors must be constructed for exterior use. Exterior doors must provide at least a thirty-five inch wide by seventy-nine inch high clear opening (36" x 80" door). Each swinging exterior door must have a key-operated lock that has a deadlock latch. A deadlock with a passage set installed below the deadlock may be used as an acceptable alternate for each exterior door. The locking mechanism must be engaged or disengaged by the use of a lever or other device from the interior of the commercial coach. Locks must not require the use of a key for operation from the inside.

(3) Every room designed for dormitory sleeping, unless it has an exterior exit door, must have at least one window which can be opened from the inside without using tools. This window must provide a clear opening of at least twenty-two inches in its smallest dimension and five square feet in area with the bottom of the opening not more than three feet above the floor. If a screen or storm window is used it must be readily removable without using tools.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1180, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1190 Interior privacy. If a commercial coach interior door, such as a bathroom door, has a privacy lock, the lock must contain an emergency release. The emergency release must be on the outside to permit entry when the door is locked from the inside.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1190, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1195 Fire warning equipment—Automatic smoke detectors. (1) At least one smoke detector (which may be a single station smoke detector) must be installed in each commercial coach to protect each separate bedroom. Smoke detectors must meet the require-

ments of the Standard for Single and Multiple Station Smoke Detectors of the Underwriters Laboratories Inc. (UL 217). All dormitories must have at least one installed smoke detector.

(2) A smoke detector must be installed in the hallway or area next to the bedroom, and must be mounted, where possible, between the commercial area and the first bedroom door on an interior wall. Where mounting cannot be achieved due to limited interior wall space, the smoke detector must be located as close as practical to the first bedroom door on an interior wall. Commercial coaches having bedrooms separated by one or a combination of common use areas (such as a kitchen, dining area, or a commercial area, but, not a bathroom) must have at least two smoke detectors, one smoke detector protecting each bedroom.

(3) Smoke detectors must be installed per their listing. The smoke detector mounting must be attached to an electrical outlet box and the detector must be permanently wired into a general purpose electrical circuit. There must be no switches in the circuits to the detectors other than the circuit breaker serving the circuits.

(4) The commercial coach manufacturer must provide a copy of the testing and maintenance instructions supplied by the manufacturer of the smoke detector for the information of the consumer and users of the commercial coach.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1195, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1200 Installation instructions. The manufacturer must provide printed instructions upon request for each commercial coach specifying the following:

(1) The location and required capacity of stabilizing devices, such as tie downs, piers, and blocking;

(2) Devices and methods used to connect all components and systems including, chassis and utilities; and

(3) Leveling, including releveling.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1200, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1210 Table: Number of ties required per side of commercial coach.

NUMBER OF TIES REQUIRED PER SIDE OF COMMERCIAL COACH

Note: This table is based on a minimum working load per anchor of three thousand one hundred fifty pounds with a fifty percent overload (four thousand seven hundred twenty-five pounds total).

Length of Commercial Coach (Feet)	No. of Vertical Ties	No. of Diagonal Ties
00-40	2	3
41-46	2	3
47-49	2	3
50-54	2	3
55-58	2	4

59-64	2	4
65-70	2	4

(1) Double-width commercial coaches require only the diagonal ties specified, and these must be placed along the outer side walls;

(2) Length of commercial coach (as used in this table) means length excluding draw bar;

(3) Diagonal ties in this method must deviate at least forty degrees from a vertical direction; or

(4) The number of ties required can be designed by a professional engineer.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1210, filed 10/23/96, effective 11/25/96.]

ELECTRICAL

WAC 296-150C-1220 Electrical—General. This chapter applies to the installation of electrical equipment in any commercial coach bearing or required to bear a department insignia.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1220, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1230 Electrical definitions. Definitions contained in the current adopted edition National Electrical Code (NEC), and the following definitions apply to the commercial coach electrical standards in this chapter.

"**Converter**" is a device that changes electrical energy from one form to another, as from alternating current to direct current.

"**Feeder assembly**" or "**subpanel**" is the overhead or under-chassis feeder conductor, including the grounding conductor, fittings, and equipment, or power-supply cord approved for commercial coach.

The feeder assembly or subpanel is used in commercial coaches and designed to deliver energy from the source of electrical supply to the distribution panelboard within the commercial coach.

"**Low voltage**" is an electromotive force rated at thirty-two volts or less, supplied from a transformer, converter, or battery.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1230, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1240 Branch circuit and feeder calculations. Branch circuit and feeder calculations must be determined according to the National Electrical Code.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1240, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1250 Disconnecting means and branch circuit protective equipment. (1) The branch circuit equipment may be combined with the disconnecting means as a single assembly. Such a combination may be designated as a distribution panelboard. If a fused distribu-

tion panelboard is used, the maximum fuse size for the mains must be plainly marked with lettering at least 1/4 inch high and visible when fuses are changed.

Note: See the National Electrical Code concerning identification of each disconnecting means and each feeder or branch circuit at the point where it originated and type of marking needed.

(2) Plug fuses and fuseholders must be tamper-resistant, Type "S," enclosed in dead-front fuse panelboards.

(3) A single disconnecting means must be provided in each commercial coach. It must consist of a circuit breaker or a switch, fuses, and their accessories installed in a readily accessible location near the point of entrance of the supply cord or conductors into the commercial coach. The main circuit breakers or fuses must be plainly marked "main." This equipment must contain a solderless type of grounding connector or bar for the purposes of grounding, with sufficient terminals for all grounding conductors. The neutral bar termination of the grounded circuit conductors must be insulated.

(4) The disconnecting equipment must have a rating suitable for the connected load. The distribution equipment, either circuit breaker or fused type, must be located a minimum of twenty-four inches from the bottom of such equipment to the floor level of the commercial coach. There must be an accessible space of at least thirty inches wide by thirty-six inches deep by seventy-eight inches high in front of the electrical disconnect equipment. The main circuit breakers or switches must be plainly marked "main." There must be a label attached to the panelboard stating:

"This panelboard must be connected by a feeder assembly having overcurrent protection rated at not more than _____ amperes." (The correct ampere rating must be marked in the blank space.)

(5) Branch circuit distribution equipment must be installed in each commercial coach and must include overcurrent protection for each branch circuit consisting of either circuit breakers or fuses.

(6) The branch circuit overcurrent devices must be rated:

(a) Not more than the circuit conductors; and
(b) Not more than one hundred fifty percent of the rating of a single appliance rated ten amperes or more; but

(c) Not more than the overcurrent protection rating marked on the motor-operated appliance. A device not approved for branch circuit protection, such as a thermal cutout or motor overload protective device, must not be considered as the overcurrent device protecting the circuit.

(7) A 20-ampere fuse or circuit breaker must be considered adequate protection for fixture leads, cords for portable appliances and No. 14 AWG (American Wire Gauge) tap conductors, not over six feet long, for recessed lighting fixtures.

(8) If more than one outlet or load is on a branch circuit, a 15-ampere receptacle must be considered protected by a 20-ampere fuse or circuit breaker.

(9) When circuit breakers are provided for branch circuit protection, 240-volt circuits must be protected by two-pole common or companion trip circuit breakers.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1250, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1260 Power supply—Feeder assembly equipment. A commercial coach must be provided with feeder assembly equipment, installed by the manufacturer according to National Electrical Code and the provisions of this chapter. The assembly must be either:

(1) One overhead assembly containing the required number of insulated color-coded feeder conductors, one of which must be a grounding conductor; or

(2) One under-vehicle assembly consisting of conduit running from the commercial coach branch circuit panelboard to the underside of the commercial coach. Conduit must be sized in accordance with the National Electrical Code; or

(3) Other installations approved by the department.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1260, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1270 Identification of feeder assembly connection. (1) Each commercial coach equipped with a 120-volt electrical system must have a label, permanently attached on the outside wall adjacent to the point of entrance of the feeder assembly, that reads:

"THIS CONNECTION IS FOR 110-125 VOLT AC SERVICE. DO NOT CONNECT HIGHER VOLTAGE."

(2) Each commercial coach equipped with a 120/240-volt AC electrical system must have a label, permanently attached on the outside wall, adjacent to the point of entrance of the supply assembly or permanently installed feeders, that reads:

"THIS CONNECTION IS FOR 120/240 VOLT AC _____ AMPERE SERVICE." (The correct service rating shall be stamped in the blank space.)

(3) Each commercial coach equipped with a 480/277-volt electrical system must have a label, permanently attached on the outside wall, adjacent to the point of entrance of the supply assembly or permanently installed feeders, that reads:

"THIS CONNECTION IS FOR 480/277 VOLT AC _____ AMPERE SERVICE." (The correct service rating shall be stamped in the blank space.)

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1270, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1280 Wiring methods—Wiring of expandable or multiple units. (1) Where circuits in expandable or multiple units are designed to be energized from one main panelboard, permanent-type wiring methods and materials must be used for connecting the units to each other.

(2) Commercial coaches may have individual branch circuit panelboards installed in each unit subject to the requirements of this chapter.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1280, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1290 Under-chassis wiring. Outdoor or under-chassis wiring (120/240 volts) exposed to

moisture and mechanical damage must be protected by rigid metal conduit, electrical metallic tubing, liquid-tight flexible metal conduit, or nonmetallic conduit. The conductors shall be type RW, TW, or equivalent.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1290, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1300 Equipment mounting. Electrical equipment must be securely mounted to prevent displacement during transit. Meter bases must not be mounted on commercial coaches.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1300, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1310 Grounding—General. Grounding of both electrical and nonelectrical metal parts in a commercial coach must be through connection to a grounding bus in the commercial coach distribution panel. The grounding bus must be grounded through the green conductor in the supply cord. It may also be grounded through the feeder wiring to the service ground in the service-entrance equipment located adjacent to the commercial coach location. Do not connect either the frame of the commercial coach or the frame of any appliance to the neutral conductor in the commercial coach.

(1) The insulated neutral requirements are as follows:

(a) The grounded (neutral) circuit conductor must be insulated from the grounding conductors, from equipment enclosures, and from other grounded parts.

(b) The grounded (neutral) circuit terminals in the distribution panels and in ranges, clothes dryers, counter-mounted cooking units, and wall-mounted ovens must be insulated from the equipment enclosure.

(c) Bonding screws, straps, or buses in the distribution panel or in appliances *must be removed and discarded*.

(d) Connections of ranges and clothes dryers with 120/240 volt, 3-wire ratings must be made with 4-conductor cord and 3-pole, 4-wire grounding-type plugs or by type AC metalclad cable or individual conductors enclosed in flexible metal conduit.

(e) Type NM or type SE cable must not be used to connect a range or a dryer. This does not prohibit the use of type NM or type SE cable between the branch circuit overcurrent protective device and a junction box or range or dryer receptacle.

(f) For 120-volt rated devices, a 3-conductor cord and 2-pole, 3-wire grounding-type plug is permitted.

(2) The following equipment grounding means must be used:

(a) The green grounding wire in the supply cord or permanent feeder wiring must be connected to the grounding bus in the distribution panel or disconnecting means.

(b) In the electrical system, all exposed metal parts, enclosures, frames, lamp fixture canopies, etc., must be effectively bonded to the grounding terminal or enclosure of the distribution panel.

(c) Cord-connected appliances must be grounded by means of an approved cord with grounding conductor and grounding-type attachment plug.

(3) The following bonding requirements of noncurrent-carrying metal parts must apply:

(a) All exposed noncurrent-carrying metal parts that may become energized must be effectively bonded to the grounding terminal or enclosure of the distribution panelboard. A bonding conductor must be connected between each distribution panelboard and an accessible terminal on the chassis.

(b) Grounding terminals must be of the solderless type and approved as pressure-terminal connectors recognized for the wire size used.

(c) The bonding conductor must be solid or stranded, insulated or bare and must be No. 8 copper minimum or equal. It must be routed so as not to be exposed to physical damage.

(d) Metallic gas, water, and waste pipes and metallic air circulating ducts must be considered bonded if they are connected to the terminal on the chassis by clamps, solderless connectors or by suitable grounding-type straps.

(e) Any metallic roof and exterior covering must be considered bonded if:

(i) The metal panels overlap one another and are securely attached to the wood or metal frame parts by metallic fasteners;

(ii) The lower panel of the metallic exterior covering is secured at a cross member of the chassis by two metal fastener straps per commercial coach unit or section at opposite ends; and

(iii) The bonding strap must be a minimum of 30 gauge galvanized metal and must be a minimum of four inches wide.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1310, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1320 Dielectric strength test. (1)(a) The wiring of each commercial coach must be subjected to a one-minute, 900-volt, dielectric strength test between live parts (including neutral) and the commercial coach ground. All switches must be closed during the test. (Closed switches are in the on position.)

(b) The test may also be performed at 1,080 volts for one second. This test must be performed after branch circuits are complete and after fixtures or appliances are installed.

Exception: Fixtures and appliances are not required to withstand the dielectric strength test.

(2) Each commercial coach designed with a 480-volt electrical system must be subjected to a one-minute 1,275-volt dielectric strength test between current-carrying conductors and the coach ground. The test may also be performed at 1,500 volts for one second.

(3) Low-voltage circuit conductors in each commercial coach must withstand the applied potential without electrical breakdown of a one-minute, 500-volt, or a one-second, 600-volt, dielectric strength test. The potential must be applied between live and grounded conductors.

(4) The test is to be performed by the manufacturer and witnessed by the inspector.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1320, filed 10/23/96, effective 11/25/96.]

MECHANICAL

WAC 296-150C-1330 Mechanical—General. This chapter applies to the installation of mechanical, ventilation, and indoor air quality equipment in any commercial coach bearing or required to bear a department insignia. Mechanical, ventilation, and indoor air quality equipment and installations in or on a commercial coach shall be installed according to the requirements of the Uniform Mechanical Code, the Washington State Ventilation and Indoor Air Quality Code, the rules of this chapter, and the conditions of the equipment approval or listing agency.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1330, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1340 Mechanical definitions. Definitions contained in the current adopted edition of the Uniform Mechanical Code, and the following definitions apply to the mechanical coaches.

"Accessible" is having access to a fixture, connection, appliance, or equipment that requires the removal of an access panel, door, or similar obstruction.

"Appliance compartment" is a room having a floor area not in excess of twice the largest plan area of the room's appliance or appliances plus clearances required in this chapter.

"Automatic pilot device" is a device employed with gas-burning equipment that will either automatically shut off the gas supply to the burner being served or automatically activate, electrically or otherwise, a gas shut-off device when the pilot flame is extinguished.

"Btuh" is British thermal units per hour.

"Clearance" is the distance between the appliance, chimney, vent, or chimney or vent connector, or plenum and the nearest surface.

"Combustible material" is a material adjacent to or in contact with a heat-producing appliance, vent connector, chimney, or steam and hot water pipes, made of or surfaced with wood, compressed paper, plant fibers, or other products that will ignite and burn. Such material must be considered combustible even though flame-proofed, fire-retardant treated, or plastered.

"Connector-gas appliance" is a flexible or semi-rigid connector listed as conforming to ANSI Standard Z21.24, Metal Connectors for Gas Appliances, used to convey fuel gas, three feet or less in length (six feet or less for gas ranges), between a gas outlet and a gas appliance in the same room.

"Fuel gas piping system" is the arrangement of piping, tubing, fittings, connectors, valves, and devices designed and intended to supply or control the flow of fuel gas to an appliance.

"Gas" is fuel gas, such as natural gas, manufactured gas, undiluted liquefied petroleum gas (vapor phase only), liquefied petroleum air-gas mixtures, or mixtures of these gases that would ignite in the presence of oxygen.

"Gas-supply connection" is the terminal end or connection to which a gas-supply connector is attached.

"Input rating" is the maximum fuel-burning capacity of any warm-air furnace, recessed heater, or burner expressed in British thermal units per hour.

"Liquefied petroleum gases (LPG)" is any material that is composed predominantly of propane, propylene, butanes (normal butane or isobutane), and butylenes, or any mixture of them.

"Quick-disconnect device" is a hand-operated means of connecting and disconnecting a gas supply or connecting gas systems and is equipped with an automatic device to shut off the gas supply when disconnected.

"Readily accessible" is having direct access without the necessity of removing any panel, door, or similar obstruction.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1340, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1350 LPG system enclosure and mounting. (1) LPG containers must not be installed, nor stored temporarily, inside any commercial coach.

Exception: This prohibition does not apply to completely self-contained hand torches, lanterns, or similar equipment with containers having a maximum water capacity of two and one-half pounds (approximately one pound LPG capacity).

(2)(a) Containers, control valves and regulating equipment, when installed, must be mounted on the "A" frame of the commercial coach or installed in a compartment that is *vapor-tight* to the inside of the commercial coach and accessible only from the outside.

(b) The compartment must be ventilated at top and bottom to diffuse vapors. The compartment must be ventilated with two vents having an aggregate area of not less than two percent of the floor area of the compartment and must open without restriction to the outside. The required vents must be equally distributed between the floor and ceiling of the compartment. If the lower vent is located in the access door or wall, the bottom edge of the vent shall be flush with the floor level of the compartment. The top vent must be located in the access door or wall with the bottom of the vent not more than twelve inches below the ceiling level of the compartment. All vents must have an unrestricted discharge to the outside atmosphere. Access doors or panels of compartments must not be equipped with locks or require special tools or knowledge to open.

(3) Doors, hoods, domes, or portions of housings and enclosures required to be removed or opened for container replacement must incorporate means for clamping them firmly in place and preventing them from working loose during transit. Provisions must be incorporated in the assembly to hold the containers firmly in position and prevent their movement during transit.

(4) LPG containers must be mounted on a substantial support or a base secured firmly to the commercial coach chassis. Neither the container nor its support can extend below the commercial coach frame.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1350, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1360 Gas piping—Piping design. Commercial coaches requiring fuel gas for any purpose must be equipped with a gas piping system that is designed for LPG only or combination LPG and natural gas.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1360, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1370 Gas piping—Expandable or multiple commercial coaches. Where gas piping is to be installed in more than one portion of an expandable or multiple commercial coach, the design and construction must be as follows:

(1) There must be only one point of cross over, readily accessible from the exterior of the commercial coach.

(2) The connector between units must be a listed flexible gas connector approved for exterior use.

(3) A shut-off valve must be located on the supply side of the connection. Both a flexible gas connector that is approved for exterior use and a quick disconnect type of connector must be tested and approved to IAPMO TSC-9 standard or equal; and both must have a shut-off valve installed that is tested and approved to ANSI Z21.15 standard or equal.

(4) Protective caps or plugs must be permanently attached to the coach and used to seal the system when not in use.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1370, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1380 Concealed tubing. (1) Tubing must not be run inside walls, floors, partitions, or roofs.

(2) If tubing passes through walls, floors, partitions, roofs, or similar installations, the tubing must be protected by the use of weather resistant grommets that snugly fit both the tubing and the hole through which the tubing passes.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1380, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1390 Gas piping—Pipe-joint compound. (1) Screw joints must be made tight with pipe-joint compound that is insoluble in liquefied petroleum gas.

(2) Pipe-joint compound must be approved for the type of gas used. The pipe-joint compound must be applied to the male threads only.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1390, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1400 Gas piping—Hangers and supports. (1) All gas piping must be adequately supported by galvanized or equivalently protected metal straps or hangers at intervals of not more than four feet, except where adequate support and protection is provided by structural members.

(2) Gas pipe supply connections must be rigidly anchored to a structural member within six inches of the supply connections.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1400, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1410 Gas piping—Electrical ground. (1) Gas piping must not be used for an electrical ground.

(2) The gas line must be bonded.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1410, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1420 Identification of gas supply connections. A label must be permanently attached on the outside of the exterior wall of the commercial coach adjacent to the gas supply connection which provides the following information:

(1) The type of system (i.e., liquid petroleum system or natural gas system or combination liquid petroleum and natural gas system);

(2) The appropriate Btuh input rating; and

(3) If excess ("or more") Btuh input is allowed.

*For example: Natural Gas System
250,000 Btuh
Or More*

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1420, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1430 Gas piping system openings.

All openings in the gas piping system must be closed gas-tight with threaded pipe plugs or pipe caps.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1430, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1440 Gas piping—Valves. (1) In addition to any valve on the appliance, a shut-off valve must be installed in the fuel piping outside of each gas appliance but inside the commercial coach structure and upstream of the union or connector. The shut-off valve must be located within six feet of a cooking appliance and within three feet of any other appliance. A shut-off valve may serve more than one appliance if located as required above.

(2) Shut-off valves used in connection with gas piping must be of a type designed for use with liquefied petroleum gas. Shut-off valves must be tested and approved to ANSI Z21.15 standard or equal.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1440, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1450 Gas piping—Testing for leakage before appliances are connected. (1) The piping system must stand a pressure of at least ten psi gauge for a period of not less than fifteen minutes without showing any drop in pressure.

(2) Pressure must be measured with a gauge calibrated to be read in increments of not greater than one-tenth pound.

(3) The source of pressure must be isolated before the pressure tests are made. Before a test is begun, the tempera-

ture of the ambient air and of the piping must be approximately the same, and constant air temperature must be maintained throughout the test.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1450, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1460 Gas piping—Testing for leakage after appliances are connected. (1) After gas appliances have been connected, the gas-piping system must be subjected to a pressure test with the burner valves closed. The test consists of air at not less than ten inches nor more than fourteen inches pressure of water column (six to eight ounces). The system must hold this pressure for a period of not less than ten minutes with no leakage. Before beginning the test, the temperature of the gas-piping system and the test air must be equalized, and this shall be maintained throughout the test.

(2) Appliance shut-off valves ahead of gas cooking appliances may be closed for the performance of this test. When the test is satisfactorily performed, these valves must be opened and, while the system is under pressure, the appliance connectors must be tested with an approved leak detector or approved bubble solution.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1460, filed 10/23/96, effective 11/25/96.]

VENTILATION AND INDOOR AIR QUALITY

WAC 296-150C-1470 Ventilation and indoor air quality—General. Ventilation and indoor air quality equipment and installations in or on a commercial coach must be made according to the requirements of the Washington State Ventilation and Indoor Air Quality Code, the Uniform Mechanical Code, the rules of this chapter, and the conditions of the equipment approval.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1470, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1480 Ventilation and indoor air quality definitions. Definitions contained in the current adopted edition of the Washington State Ventilation and Indoor Air Quality Code and the Uniform Mechanical Code and the following definitions apply to the commercial coach ventilation and indoor air quality rules in this chapter.

"Duct" is a conduit or passageway for conveying air to or from heating, cooling, air conditioning, or ventilation equipment, not including the plenum.

"Plenum" is an air compartment that is part of an air-distributing system to which one or more ducts are connected.

- A **furnace-supply plenum** is a plenum attached directly to, or an integral part of, the air-supply outlet of the furnace.
- A **furnace-return plenum** is a plenum attached directly to, or an integral part of, the return inlet of the furnace.

"Vent connector" is a pipe for conveying products of combustion from a fuel-burning appliance to a vent.

"Water heater" is an appliance for heating water for domestic purposes other than for space heating.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1480, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1490 Appliances—Installation. In addition to requirements of the Washington State Ventilation and Indoor Air Quality Code:

(1) The installation of each appliance must conform to the manufacturer's installation instructions. The manufacturer's instructions must be attached to the appliance.

(2) Combustion air inlets and flue gas outlets must be listed as components of the appliance and must be completely separated. The required separation may be obtained by:

(a) The installation of direct vent system (sealed combustion system) appliances; or

(b) The installation of appliances within enclosures so that the appliance combustion system and venting system are separate from the interior atmosphere of the commercial coach. There must not be any door, removable access panel, or other opening into the enclosure from inside the commercial coach. Any openings for ducts, piping, wiring, etc., must be sealed.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1490, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1500 Safety devices—Water heater relief valves. In addition to requirements of the Washington State Ventilation and Indoor Air Quality Code:

(1) All water heaters must be installed with approved fully automatic valve or valves designed to provide temperature and pressure relief. Temperature and pressure relief valves must be tested and approved to ANSI Z21.22 standard or equal.

(2) Any temperature relief valve or combined pressure and temperature relief valve installed for this purpose must have the temperature sensing element immersed in the hottest water within the upper six inches of the tank. It must be set to start relieving at a pressure of 150 psi or the rated working pressure of the tank, whichever is lower, and at or below a water temperature of 210 degrees Fahrenheit.

(3) Relief valves must be provided with full-sized drains. Drains must be directed to the exterior sides of the unit, exiting at least six inches above the ground, and each drain pipe must exhaust with a ninety degree downward turn. Drain lines must be of a material approved for hot water distribution and must drain fully by gravity, must not be trapped, and must not have their outlets threaded.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1500, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1510 Air ducts—Expandable or multiple commercial coach connections. In addition to the requirements of the Uniform Mechanical Code and the Washington State Energy Code air ducts for:

(1) An expandable or multiple commercial coach may have ducts of the heating system installed in the various units. The points of connection must be so designed and

constructed that when the commercial coach is fully expanded or coupled, the resulting duct joint will conform to the requirements of this chapter.

(2) Installation instructions for supporting the crossover duct from the commercial coach must be provided for on-site installation. The duct must not touch the ground.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1510, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1520 Air ducts—Duct and plenum insulation. Every heating and cooling duct and plenum must be installed according to the Uniform Mechanical Code and the Washington State Energy Code.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1520, filed 10/23/96, effective 11/25/96.]

PLUMBING

WAC 296-150C-1530 Plumbing—General. This chapter also applies to the installation of plumbing equipment in any commercial coach bearing or required to bear a department insignia. Plumbing fixtures, equipment, and installations in commercial coaches must conform to the provisions of the Uniform Plumbing Code and the amendments adopted by the State Building Code Council, except part 1, unless specifically exempted or required by this section.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1530, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1540 Plumbing—Definitions. The definitions listed below, in addition to the Uniform Plumbing Code definitions apply to this chapter.

"Drain outlet" is the discharge end of the commercial coach main drain to which a drain connector may be attached.

"Main drain" is the principal artery of the commercial coach drainage system to which drainage branches may be connected.

"Water-supply connection" is the fitting or point of connection of the commercial coach water distribution system designed for connection to a water connector.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1540, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1550 Drainage—Cap or plug. Drain outlets must be equipped with a watertight cap or plug that is permanently attached to the vehicle.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1550, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1560 Drainage—Clearance from drain outlet. The drain outlet and couplers must have a minimum clearance of three inches in any direction from all parts of the structure or appurtenances and at least eighteen

inches unrestricted clearance directly in front of the drain outlet.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1560, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1570 Water supply connection. (1)

Each commercial coach equipped with a water distribution system must have a water-supply connection that terminates within eighteen inches of the outside wall of the commercial coach.

(2) Water-supply connections must be equipped with a watertight cap or plug that is permanently attached to the commercial coach.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1570, filed 10/23/96, effective 11/25/96.]

VENDOR UNIT CONVERSION CODE

GENERAL

WAC 296-150C-1580 What manufacturing codes apply when converting structures to vendor units? (1) The conversion of a structure to a vendor unit must comply with the following codes:

(a) The Uniform Mechanical Code, with the amendments made by the Washington State Building Code Council, chapter 51-32 WAC;

(b) The National Electrical Code as referenced in chapter 19.28 RCW and chapter 296-46 WAC, Installing Electric Wires and Equipment; and

(c) The Uniform Plumbing Code 1991 edition with the amendments under chapter 19.27 RCW.

(2) All construction methods and installations must use accepted engineering practices, provide minimum health and safety to the occupants of commercial coaches and the public, and demonstrate journeyman quality of work of the various trades.

(3) Requirements for any size, weight, or quality of material modified by the terms "minimum," "not less than," "at least," and similar expressions are minimum standards. The person converting a structure to a vendor unit may exceed these rules provided the deviation does not result in inferior installation or defeat the purpose and intent of this chapter.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1580, filed 10/23/96, effective 11/25/96.]

STRUCTURAL

WAC 296-150C-1590 Structural analysis for acceptability. (1) A "Type A vendor unit" is a commercial coach such as, but not limited to, a truck, van, or step van that meet the requirements of this chapter.

(2) A "Type B vendor unit" is a commercial coach such as, but not limited to, a recreational vehicle as defined by the American National Standard Institute, Inc. Conversion of a structure to a Type B vendor unit requires an engineering

analysis or structural tests to determine whether it is structurally acceptable for use.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1590, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1600 Live loads. (1) The design live loads for vendor units are:

(a) Roof 25 psf

(b) Floor 40 psf

(2) The roof live load must not be considered as acting simultaneously with the wind load. The roof and the floor live loads must not be considered as resisting the overturning moment due to wind.

(3) The roof live load and the floor live load must be considered to act both simultaneously and separately in order to determine the critical design loading for stresses and deflections.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1600, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1610 Design load deflection. When a structural assembly is subjected to total design live loads, the deflection for structural framing members must not exceed the following:

L = The clear span between supports or two times the length of a cantilever.

Floor L/240

Roof L/180

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1610, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1620 Structural load tests. (1) A structural assembly tested for qualification must sustain the design dead load plus the superimposed design live loads for vendor units (see WAC 296-150C-1600) equal to 1.75 times the required live loads for a period of twelve hours without failure of the assembly.

(2) An assembly failure is defined as a rupture, fracture, or residual deflection which is greater than the limits set in WAC 296-150C-1610.

Note: We will provide test procedure forms upon request.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1620, filed 10/23/96, effective 11/25/96.]

CONSTRUCTION

WAC 296-150C-1630 Roof coverings/membrane/weather resistant. (1) The roof covering must be securely fastened in an approved manner to the supporting roof construction and must provide weather protection for the vendor unit and the occupants.

(2) Exterior covering materials, including metal coverings, must be moisture and weather resistant and contain corrosion resistant fasteners to prevent wind and rain deterioration.

Note: Electro-plated, electro-deposited zinc, and electro-galvanized staples are not considered corrosion-resistant materials.

(3) All exterior openings or penetrations into the commercial coach around piping, ducts, plenums, or vents must be sealed with moisture-resistant material.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1630, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1640 Floors. Wood floors must be made moisture resistant by an overlay of nonabsorbent material applied with water-resistant adhesive.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1640, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1650 Floor closure material. (1) Floor closure material around piping, ducts, plenums, or vents must prevent damage to the underside of the vendor unit due to air, water, insects, dust, and be rodent resistant.

(2) The floor closure material must meet ASTM D-781 standard or equal and be installed as follows:

(a) Fibrous material (with or without patches) must meet or exceed the level of forty-eight inch-pounds of puncture resistance as tested.

(b) Patching material must be installed according to installation instructions furnished by the supplier of the material.

(c) The material must be suitable for patches and the patch life must be equivalent to the material life.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1650, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1660 Chassis approval. The vendor unit chassis and running gear can be approved by either:

(1) Engineering calculations done per WAC 296-150C-1080; or

(2) A letter from an engineer which certifies that the chassis will support the loads imposed upon the chassis. This letter must be sealed with a wet stamp and signed by the engineer who made the analysis.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1660, filed 10/23/96, effective 11/25/96.]

MATERIALS

WAC 296-150C-1670 Standards for equipment and installations. (1) The manufacturer's equipment and installation specifications must be followed. Other approved standards are acceptable when:

- Installed according to the manufacturer's installation instructions; and
- Approved by a listing or testing agency.

Note: Gas furnaces, gas water heaters, and gas refrigerators *must* be sealed combustion or completely separated from the interior of the vendor unit.

(2) No solid fuel (e.g., charcoal) appliances may be installed in a vendor unit.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1670, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1680 Flame-spread limitations. For flame-spread requirements see WAC 296-150C-1100.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1680, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1690 Cabinet protection. (1) The bottom and sides of combustible cabinets over cooking appliances or tops including a space of six inches from the edge of the burners must be protected with at least one-quarter inch thick asbestos millboard covered with at least 26 gauge sheet metal (.017 stainless steel, .024 aluminum or .020 copper) or equivalent protection. The protective metal over the range must form a hood with not less than a three-inch eyebrow (measuring horizontally from face of cabinet).

(2) The hood must be centered over and at least as wide as the top of the cooking appliance.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1690, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1700 Insulation standards. When a source of heating or cooling is installed, the vendor unit must comply with the Washington State Energy Code, unless another state law supersedes the Washington State Energy Code.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1700, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1710 Light and ventilation. Each bathroom must be provided with artificial light and with a window having at least 1/2 square feet of glazed area that can be fully opened, except where a mechanical ventilation system is installed. Any mechanical ventilation system must exhaust directly to the outside of the vendor unit.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1710, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1720 Vendor unit exits. At least one vending unit exit must comply with the following:

- (1) Exterior doors must be constructed for exterior use.
- (2) The exterior door must be at least thirty-inches wide by seventy-two inches high.

(3) Each swinging exterior door must have a key-operated lock that has a deadlock latch. A deadlock with a passage set installed below the deadlock may be used as an acceptable alternate for each exterior door. The locking mechanism must be engaged or disengaged by the use of a lever, knob, button, handle, or other device from the interior of the vending unit.

(4) Locks must not require the use of a key for operation from the inside.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1720, filed 10/23/96, effective 11/25/96.]

ELECTRICAL**WAC 296-150C-1730 Electrical for vendor units.**

The electrical system in any vendor unit must comply with the National Electrical Code as referenced in chapter 19.28 RCW, Article 550 and the applicable portions of other Articles as required by this section.

(1) Appliances must be installed per Articles 422 - Appliances.

(2) Generators must be installed per Article 445 - Generators.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1730, filed 10/23/96, effective 11/25/96.]

MECHANICAL**WAC 296-150C-1740 Mechanical for vendor units.**

This chapter applies to the installation of mechanical, ventilation, and indoor air quality equipment in any vendor unit bearing or required to bear a department insignia. Mechanical, ventilation, and indoor air quality equipment is installed in or on a vendor unit, it must be installed according to the requirements of the Uniform Mechanical Code, the Washington State Ventilation and Indoor Air Quality Code, the rules of this chapter, and the conditions of the equipment approval or listing agency.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1740, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1770 Appliances—Installation. In addition to requirements of the Washington State Ventilation and Indoor Air Quality Code:

(1) The installation of each appliance must conform to the manufacturer's installation instructions. The manufacturer's instructions must be attached to the appliance.

(2) Combustion air inlets and flue gas outlets must be listed as components of the appliance and must be completely separated. The required separation may be obtained by:

(a) The installation of direct vent system (sealed combustion system) appliances; or

(b) The installation of appliances within enclosures so that the appliance combustion system and venting system are separate from the interior atmosphere of the commercial coach. There must not be any door, removable access panel, or other opening into the enclosure from the inside of the commercial coach. Any openings for ducts, piping, wiring, etc., must be sealed.

(3) Ranges, cooktops, and ovens must not burn outside combustion air.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1770, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1780 Safety devices—Water heater relief valves. (1) All water heaters must be installed with approved fully automatic valve or valves designed to provide temperature and pressure relief. Temperature and pressure

relief valves must be tested and approved to ANSI Z21.22 standard or equal.

(2) Any temperature relief valve or combined pressure and temperature relief valve installed for this purpose must have the temperature sensing element immersed in the hottest water within the upper six inches of the tank. It must be set to start relieving at a pressure of 150 psi or the rated working pressure of the tank, whichever is lower, and at or below a water temperature of 210 degrees Fahrenheit.

(3) Relief valves must be provided with full-sized drains. Drains must be directed to the exterior of the unit, exiting at least six inches above the ground, and must exhaust downward. Drain lines must be of a material approved for hot water distribution and must drain fully by gravity, must not be trapped, and must not have their outlets threaded.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1780, filed 10/23/96, effective 11/25/96.]

PLUMBING

WAC 296-150C-1790 Plumbing—General. This chapter also applies to the installation of plumbing equipment in any vendor unit bearing or required to bear a department insignia. Plumbing fixtures, equipment, and installations in vendor units must conform to the provisions of the Plumbing Code and the amendments adopted by the State Building Code Council, except part 1, unless specifically exempted or required by this section.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1790, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1800 Plumbing—Definitions. Definitions contained in the Uniform Plumbing Code apply to this chapter:

"**Drain outlet**" is the discharge end of the commercial coach main drain to which a drain connector may be attached.

"**Main drain**" is the principal artery of the commercial coach drainage system to which drainage branches may be connected.

"**Water-supply connection**" is the fitting or point of connection of the commercial coach water distribution system to a water connector.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1800, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1810 Drainage—Cap or plug. Drain outlets must be equipped with a watertight cap or plug that must be permanently attached to the vehicle.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1810, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1820 Drainage—Clearance from drain outlet. The drain outlet and couplers must have a minimum clearance of three inches in any direction from all parts of the structure or appurtenances and with at least

eighteen inches unrestricted clearance directly in front of the drain outlet.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1820, filed 10/23/96, effective 11/25/96.]

tight cap or plug that must be permanently attached to the vehicle.

Note: The department of health may have more restrictive requirements. Before modifying your unit to comply with these requirements be sure to contact them.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-1830, filed 10/23/96, effective 11/25/96.]

WAC 296-150C-1830 Water supply connection.
Water-supply connections must be equipped with a water

COMMERCIAL COACH FEES

WAC 296-150C-3000 Commercial coach fees.

INITIAL FILING FEE	\$ 25.00
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DESIGN PLAN FEES	
INITIAL FEE-MASTER DESIGN	\$170.00
INITIAL FEE-ONE YEAR DESIGN	70.00
RENEWAL FEE	30.00
RESUBMIT FEE	50.00
ADDENDUM	50.00
PLANS APPROVED BY PROFESSIONALS	35.00

DEPARTMENT INSPECTION FEES	
INSPECTION/REINSPECTION*	\$ 50.00
TRAVEL (PER HOUR)*	50.00
PER DIEM**	
HOTEL***	
MILEAGE**	
RENTAL CAR***	
PARKING***	
AIRFARE***	

DEPARTMENT AUDIT FEES	
AUDIT (PER HOUR)*	\$50.00
TRAVEL (PER HOUR)*	50.00
PER DIEM**	
HOTEL***	
MILEAGE**	
RENTAL CAR***	
PARKING***	
AIRFARE***	

INSIGNIA FEES	
FIRST SECTION	\$ 15.00
EACH ADDITIONAL SECTION	10.00
ALTERATION	25.00
REISSUED-LOST/DAMAGED	10.00

FIELD TECHNICAL SERVICE FEE (PER HOUR)	\$50.00
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* Minimum charge of 1 hour for inspection; time spent greater than 1 hour is charged in 1/2 hour increments
 ** Per state guidelines.
 *** Actual charges incurred.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150C-3000, filed 10/23/96, effective 11/25/96.]

Chapter 296-150F WAC FACTORY-BUILT HOUSING AND COMMERCIAL STRUCTURES

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296-150F-0080 Do you allow a local enforcement agency to inspect factory-built housing, commercial structures, and components at the manufacturing location?
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INSIGNIA

- 296-150F-0200 Who must purchase factory-built housing and commercial structure insignia?
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296-150F-0540 Who inspects factory-built housing and commercial structures for installation at the building site?
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- 296-150F-0700 Must manufacturers of factory-built housing and commercial structures notify you if they manufacture at more than one location?
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296-150F-0720 Must manufacturers of factory-built housing and commercial structures notify you of a change in business ownership?

FACTORY-BUILT HOUSING AND COMMERCIAL STRUCTURE FEES

- 296-150F-3000 Factory-built housing and commercial structure fees.

WAC 296-150F-0010 Authority, purpose, and scope. (1) This chapter is authorized by RCW 43.22.420, 43.22.434 and 43.22.450 through 43.22.490, covering the construction and approval of factory-built housing and commercial structures before occupancy.

(2) This chapter applies to the approval:

(a) Of factory-built structures used for residences or commercial purposes; and

(b) After occupancy of a factory-built house or commercial structure, all inspections are done by the local enforcement agency.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150F-0010, filed 10/23/96, effective 11/25/96.]

WAC 296-150F-0020 What definitions apply to this chapter? "Approved" is approved by the department of labor and industries.

"Building site" is a tract, parcel, or subdivision of land on which a factory-built house or commercial structure will be installed.

"Closed construction" is a factory-built house, commercial structure, or component that is not open for visible inspection at the building site. It may enclose factory-installed structural, mechanical, electrical, plumbing, or other systems and equipment.

"Commercial structure" is a structure designed or used for human habitation (such as a dormitory) or human

occupancy for industrial, educational, assembly, professional, or commercial purposes. It may also include a component.

"**Component**" is a discrete element that cannot be inspected at the time of installation either in the factory or in a site-built unit, but is:

- Designed to be installed in a structure;
- Manufactured as a unit; and
- Designed for a particular function or group of functions.

A component may be a floor, wall panel, roof panel, plumbing wall, electrical service wall, or heating assembly.

It may also be a service core. A service core is a factory assembled, three-dimensional section of a building. It may include mechanical, electrical, plumbing, and related systems. It may be a complete kitchen, bathroom, or utility room. Service cores are referred to as "wet boxes," "mechanical cores," or "utility cores."

Note: A roof truss is not considered a component.

"**Damaged in transit**" is damage that effects the integrity of the structural design or damage to any other system referenced in the codes required by the State Building Code, or other applicable codes.

"**Department**" is the department of labor and industries. The department may also be referred to as "we" or "us" in this chapter. Note: You may contact us at: Department of Labor and Industries, Specialty Compliance, PO Box 44440, Olympia, WA 98504-4440.

"**Design plan**" is a plan for the construction of factory-built housing, commercial structures, or components that includes floor plans, elevation drawings, specifications, engineering data, or test results necessary for a complete evaluation of the design.

"**Design option**" is a design that a manufacturer may use as an option to its design plan.

"**Equipment**" is all material, appliances, devices, fixtures, fittings, or accessories used in the manufacture, assembly, installation, or alteration of factory-built housing, commercial structures, and components.

"**Factory assembled structure (FAS) advisory board**" is a board authorized to advise the director of the department regarding the issues and adoption of rules relating to factory-built housing, commercial structures and components. (See RCW 43.22.420.)

"**Factory-built housing**" is housing designed for human occupancy such as a single-family dwelling. The structure of any room is entirely or substantially prefabricated or assembled at a place other than a building site. It may also include a component. A factory-built house is also referred to as a "modular" structure. Factory-built housing does not include manufactured (mobile) housing. (See RCW 43.22.450(3).)

"**Insignia**" is a label that we attach to a structure to verify that a factory-built house or commercial structure meets the requirements of this chapter. It could also be a stamp or label attached to a component to verify that it meets the requirements of this chapter. See also the definition for temporary insignia.

"**Install**" is to erect or set in place a structure at a building site. It may also be the construction or assembly of a component as part of a factory-built house or commercial structure.

"**Listed**" is a piece of equipment, a component, or an installation that appears in a list published by a testing or listing agency and is suitable for use in a specified manner.

"**Listing agency**" is an organization whose business is approving equipment, components, or installations for publication.

"**Local enforcement agency**" is an agency of city or county government with power to enforce local regulations governing the installation of factory-built housing and commercial structures.

"**Master design plan**" is a design plan that expires when a new State Building Code has been adopted.

"**Manufacturing**" is making, fabricating, forming, or assembling a factory-built house, commercial structure, or component.

"**One-year design plan**" is a design plan that expires one year after approval or when a new State Building Code has been adopted.

"**Repair**" is the replacement, addition, modification, or removal of any construction, equipment, system, or installation to correct damage in transit or during on-site installation before occupancy.

"**Temporary insignia**" is a label that we attach to a structure to verify that the factory-built house or commercial structure meets the requirements of this chapter. A temporary insignia is used when the final destination of a structure has not been determined. This temporary insignia must be replaced with a permanent insignia prior to delivery of the structure to a building site. Fees for temporary insignia or their replacement with permanent insignia are shown in WAC 296-150F-3000.

"**Unit**" is a factory-built house, commercial structure, or component.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150F-0020, filed 10/23/96, effective 11/25/96.]

WAC 296-150F-0030 How is this chapter enforced?

(1) To enforce this chapter, we or another governmental inspection agency will inspect each factory-built house and commercial structure that is sited in Washington. Inspections will be conducted during normal work hours or at other reasonable times. (See WAC 296-150F-0070.)

(2) We will inspect each unit as required by the codes. (See WAC 296-150F-0500.)

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150F-0030, filed 10/23/96, effective 11/25/96.]

WAC 296-150F-0040 Will you keep my manufacturing information confidential? We will only release manufacturing information such as design plans, specifications, and test results according to the requirements of the Public Records Act. (See RCW 42.17.310 (1)(h).)

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150F-0040, filed 10/23/96, effective 11/25/96.]

WAC 296-150F-0070 Do you have reciprocal agreements with other states to inspect factory-built housing and commercial structures, and components?

(1) We have entered into reciprocal agreements with states who have construction standards that are equal to or greater than our standards for factory-built housing and commercial structures.

(2) When we have a reciprocal agreement with another state:

(a) The reciprocal state inspects factory-built housing, commercial structures, and components manufactured in that state before shipment into Washington to ensure compliance with our laws. After inspection, the reciprocal state applies our insignia.

(b) The department inspects factory-built housing, commercial structures, and components manufactured in Washington before shipment into the reciprocal state to ensure compliance with their laws. After inspection, we apply the insignia of the reciprocal state.

(3) We have reciprocal agreements on file.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150F-0070, filed 10/23/96, effective 11/25/96.]

WAC 296-150F-0080 Do you allow a local enforcement agency to inspect factory-built housing, commercial structures, and components at the manufacturing location? (1) A local enforcement agency (city or county), under contract with us, can inspect factory-built housing, commercial structures, and components. In some cases their contract may be limited to specific portions of an inspection at specified manufacturing locations.

(2) After approving a unit, the local enforcement agency will attach the insignia, which indicates the unit has passed inspection.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150F-0080, filed 10/23/96, effective 11/25/96.]

WAC 296-150F-0100 What happens if I disagree with your decision regarding my compliance with this chapter? (1) If we determine you are in violation of this chapter, you will receive a notice of noncompliance.

(2) If you disagree with our decision, you can send us a written request for a hearing, stating why you disagree.

(3) After we receive your hearing request, we will:

(a) Schedule a hearing within thirty days after we receive your request.

(b) Notify you of the time, date, and place for the hearing. If you fail to appear, your case will be dismissed.

(c) Hear your case.

(d) Send you written notice of our decision.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150F-0100, filed 10/23/96, effective 11/25/96.]

WAC 296-150F-0110 Do you have an advisory board to address factory-built housing and commercial structure issues? The factory assembled structures (FAS) board advises us on issues relating to structural, plumbing, mechanical, electrical, installation, inspections, and rules for factory-assembled structures. (See RCW 43.22.420.)

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150F-0110, filed 10/23/96, effective 11/25/96.]

WAC 296-150F-0120 Where can I obtain technical assistance regarding factory-built housing and commercial structures? We provide field technical service to factory-built housing and commercial structure manufacturers for an hourly fee. Field technical service may include an evaluation, consultation, plan examination, interpretation, and clarification of technical data relating to the application of our rules. It does not include inspections.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150F-0120, filed 10/23/96, effective 11/25/96.]

INSIGNIA

WAC 296-150F-0200 Who must purchase factory-built housing and commercial structure insignia? (1) You must obtain insignia from us for each factory-built house and commercial structure sited in Washington state.

(2) You do not need to purchase our insignia if you manufacture factory-built housing and commercial structure in Washington for sale outside the state.

(3) You must have an approved design plan and have passed inspection before an insignia can be attached to your factory-built home or commercial structure by us or our authorized agent.

(4) If a unit is damaged in transit after leaving the manufacturing location or during an on-site installation, and a repair is necessary, you must purchase an insignia from us. The insignia indicates that the unit was repaired.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150F-0200, filed 10/23/96, effective 11/25/96.]

WAC 296-150F-0210 What are the insignia requirements? (1) If you are applying for insignia for factory-built housing and commercial structures you must have your design plan approved and your units inspected and approved by us.

(2) We will attach the insignia after:

(a) We receive the required forms and fees from you (see WAC 296-150F-3000); and

(b) Your unit has passed final inspection. (See WAC 296-150F-0500.)

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150F-0210, filed 10/23/96, effective 11/25/96.]

WAC 296-150F-0220 How do I obtain insignia information and the required forms? Upon request, we will provide you with a packet of information that includes the required forms.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150F-0220, filed 10/23/96, effective 11/25/96.]

WAC 296-150F-0230 What are the insignia application requirements? (1) If you are requesting insignia for

units that you intend to manufacture under a *new design plan*, your completed application must include:

- (a) A completed design plan approval request form;
- (b) One complete set of design plans, specifications, engineering analysis, test procedures and results, plus one additional set for each manufacturing location where the design plan will be used;
- (c) At least one set of design plans must have an original wet stamp from a professional engineer or architect licensed in Washington state. We will retain the set with the original wet stamp; and
- (d) A one-time initial filing fee, the design plan fee (if we approve your design plan) and the fee for each insignia. (See WAC 296-150F-3000.)

(2) If you are requesting insignia under an *approved design plan*, your completed application must include:

- (a) A completed application for insignia form; and
- (b) The fee for each insignia requested. (See WAC 296-150F-3000.)

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150F-0230, filed 10/23/96, effective 11/25/96.]

WAC 296-150F-0250 How do I replace lost or damaged insignia? (1) If an insignia is lost or damaged after it is attached to your factory-built house, commercial structure, or component, you may obtain a replacement insignia.

(2) You should contact us and provide the following information:

- (a) Your name, address, and telephone number;
- (b) The name of the manufacturer;
- (c) The serial number;
- (d) The manufacturer number (M#), if available;
- (e) The insignia number, if available; and
- (f) The required fee. (See WAC 296-150F-3000.)

(3) If we can determine that your unit previously had an insignia, we will attach an insignia to your unit once we receive your insignia fee. (See WAC 296-150F-3000.)

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150F-0250, filed 10/23/96, effective 11/25/96.]

DESIGN PLAN

WAC 296-150F-0300 When is design plan approval required? Design plans for factory-built housing and commercial structures prior to installation at the building site in Washington must be approved when:

- (1) You build a new unit;
- (2) You modify an approved design plan through an addendum; or
- (3) You add options to an approved design plan through an addendum.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150F-0300, filed 10/23/96, effective 11/25/96.]

WAC 296-150F-0310 Who can approve design plans? (1) Design plans can be approved by us or by a

licensed professional or firm authorized by us (see WAC 296-150F-0420 and 296-150F-0430).

(2) All electrical design plans for new or altered electrical installations for educational institutions, health care facilities, and other buildings (see chapters 296-46, 296-130, 296-140, and 296-150 WAC Table 1 or 2) must be reviewed and approved by us.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150F-0310, filed 10/23/96, effective 11/25/96.]

DESIGN-PLAN APPROVAL BY THE DEPARTMENT

WAC 296-150F-0320 What must I provide with my request for design-plan approval by the department? All requests for design-plan approval must include:

- (1) A completed design-plan approval request form;
- (2) One complete set of design plans, specifications, engineering analysis, test procedures and results plus one additional set for each manufacturing location where the design plan will be used (see WAC 296-150F-0340 and 296-150F-0350);
- (3) At least one set of design plans must have an original wet stamp from a professional engineer or architect licensed in Washington state. We will retain the set with the original wet stamp;

(4) A one-time initial filing fee and the design-plan fee (see WAC 296-150F-3000); and

(5) A "key drawing" to show the arrangement of modules if the plan covers three or more modules.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150F-0320, filed 10/23/96, effective 11/25/96.]

WAC 296-150F-0340 What must an engineering analysis for design plans include? (1) The engineering analysis must show that the structural design meets the requirements of this chapter.

(2) An engineering analysis must be conducted according to accepted engineering practices and must be signed by a professional engineer or architect licensed in Washington state.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150F-0340, filed 10/23/96, effective 11/25/96.]

WAC 296-150F-0350 What must the test procedures and results for design plans include? (1) Tests to a design for a factory-built home or commercial structure must be witnessed by a professional engineer or architect licensed in Washington state.

- (2) Test reports must contain the following items:
 - (a) A description of the methods or standards that applied to the test;
 - (b) Drawings and a description of the item tested;
 - (c) A description of the test set-up;
 - (d) The procedure used to verify the correct load;
 - (e) The procedure used to measure each condition;

(f) Test data, including applicable graphs and observations of the characteristics and behavior of the item tested; and

(g) Analysis, comments, and conclusion.

(3) The written test procedures, results and conclusions must reference the applicable design plan.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150F-0350, filed 10/23/96, effective 11/25/96.]

WAC 296-150F-0380 What happens if you approve my design plan? (1) Your design plan will be approved if it meets the requirements of this chapter.

(2) We will send you an approved copy of the design plan with the design-plan approval number.

(3) You must keep copies of the approved design plan at each location where a factory-built house, commercial structure, or component is built.

(4) If your design plan is not approved, you will be notified in writing of plan deficiencies. You may send a corrected design plan to us. (See WAC 296-150F-3000.)

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150F-0380, filed 10/23/96, effective 11/25/96.]

WAC 296-150F-0390 If my design plan is not approved, how much time do I have to submit a corrected design plan? (1) You have ninety days to correct and resubmit your original design plan and send us the resubmittal fee after we notify you of plan deficiencies. After ninety days, your initial design plan is returned to you.

(2) If you submit your corrected design plan after ninety days, you must send the initial design plan fee instead of the resubmittal fee. (See WAC 296-150F-3000.)

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150F-0390, filed 10/23/96, effective 11/25/96.]

WAC 296-150F-0400 What happens after my design plan is approved? Once your design plan is approved, we will inspect each related factory-built house, commercial structure, or component.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150F-0400, filed 10/23/96, effective 11/25/96.]

WAC 296-150F-0410 When does my design plan expire? Master design plan:

(1) Your master design plan expires when there is a code change. You must submit new design plans for approval when there is a State Building Code cycle change. You may use your approved master design plans to order insignia as long as they comply with the applicable codes.

One-year design plan:

(2) Your factory-built home or commercial structure one-year design plan expires either one year after approval or when there is a code change. You must submit new design plans for approval when there is a State Building Code cycle change. You may use your design plan to order insignia as long as they comply with the applicable codes.

(3) All National Electrical Code amendments may be incorporated by an addendum to your design plan.

Note: The State Building Code is on a three-year code cycle which coincides with the State Building Code council amendment cycle. The National Electrical Code (NEC) cycle, however, does not coincide with the other code cycles.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150F-0410, filed 10/23/96, effective 11/25/96.]

WAC 296-150F-0415 Who approves addendums to design plans approved by the department? You must have us approve an addendum to a design plan, if we initially approved your design plan.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150F-0415, filed 10/23/96, effective 11/25/96.]

DESIGN-PLAN APPROVAL BY A LICENSED PROFESSIONAL OR FIRM

WAC 296-150F-0420 Who can be authorized to approve design plans? (1) A professional engineer, architect or firm licensed by the state of Washington according to the Engineers Registration Act, chapter 18.43 RCW and/or the Architects Registration Act, chapter 18.08 RCW; or

(2) A professional engineer, architect or firm licensed in another state that has licensing or certification requirements that meet or exceed Washington requirements.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150F-0420, filed 10/23/96, effective 11/25/96.]

WAC 296-150F-0430 What information must a professional or firm provide to be authorized to approve design plans? (1) Name, a copy of your certificate of registration, and address of the professional engineer or architect; or

(2) Name, a copy of your certificate of authority, and address of the firm; and

(3) A description of the services the professional engineer, architect, or firm will provide; and

(4) A description of the professional's area(s) of expertise and qualifications which include:

(a) A summary of the professional's or firm's experience; and

(b) Verification of experience in your area of expertise such as structural, mechanical, plumbing, energy, electrical, fire and life safety, and ventilation and indoor air quality.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150F-0430, filed 10/23/96, effective 11/25/96.]

WAC 296-150F-0440 How will I know whether I am authorized to approve design plans? Within sixty days after you submit the information requested in WAC 296-150F-0430, we will send you a letter either approving or denying your authorization request.

(1) If we approve your request, your name is added to the list of licensed professionals and firms authorized to approve design plans.

(a) We will authorize a professional to approve portions of a design plan within his or her area of expertise; and

(b) We will authorize an engineering or architectural firm to approve plans if the firm employs or contracts with professionals within the area of expertise necessary for the design plan.

(2) If we do not approve your request, we will notify you in writing why we are denying your request for authorization. If you disagree with our decision, you can send us a written request for a hearing, stating why you disagree. (See WAC 296-150F-0100.)

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150F-0440, filed 10/23/96, effective 11/25/96.]

WAC 296-150F-0450 How long is a licensed professional or firms authorization effective? Your authorization to approve design plans is effective until your license expires, is revoked or is suspended.

(1) You must notify us of your license renewal at least fifteen days before your license expires, to prevent your name from being removed from our licensed professional and firm list.

(2) You must notify us immediately if your license is revoked or suspended. Your name is then removed from the list of licensed professionals and firms authorized to approve design plans.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150F-0450, filed 10/23/96, effective 11/25/96.]

WAC 296-150F-0460 What information must a manufacturer provide when a professional or firm does the design plan approval? You must provide the following information with your approved design plan:

(1) A completed departmental design plan approval request form;

(2) Two or more sets of the design plans plus elevation drawings, specifications, engineering analysis, and test results and procedures necessary for a complete evaluation of the design. These design plans must have an original wet stamp, be signed, and dated by the approving professional(s) (see WAC 296-150F-0340 and 296-150F-0350);

(3) A cover sheet on the design plan noting which professional approved each portion of the design plan;

(4) A copy of the authorization letter from us;

(5) The design plan fee for design plans approved by professionals or firms (see WAC 296-150F-3000); and

(6) A professional who designs and certifies that the factory-built home or commercial structure design meets state requirements cannot also approve the design plan in the plan approval process.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150F-0460, filed 10/23/96, effective 11/25/96.]

WAC 296-150F-0470 What happens after we receive the professional or firm approved design plan

and information? (1) After we receive your approved design plans and information, we will review the information and assign a plan approval number. We will send a copy of the design plan with the plan approval number to the manufacturer.

(2) We may periodically audit design plans approved by a professional engineer, architect, or firm to ensure compliance with design plan requirements. The department's periodic audit should not be construed as certifying that the plans are safe.

(3) If the audit reveals that the design plans approved by the professionals and firms do not comply with this chapter, you will be notified and required to pay our fees for review and approval of the design plans. (See WAC 296-150F-3000.)

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150F-0470, filed 10/23/96, effective 11/25/96.]

WAC 296-150F-0480 Do you have a list of professionals or firms that are authorized to submit design plans? We will maintain a list of the licensed professionals and firms that are authorized to approve design plans for factory-built housing and commercial structures.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150F-0480, filed 10/23/96, effective 11/25/96.]

WAC 296-150F-0490 Who approves addendums to design plans approved by a professional or firm? (1) You must have the professional or firm approve an addendum to a design plan, if they initially approved your design plan.

(2) If the professional or firm who approved your design plan is no longer on the department list you may have us approve your addendum.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150F-0490, filed 10/23/96, effective 11/25/96.]

INSPECTIONS PRIOR TO ISSUANCE OF AN INSIGNIA

WAC 296-150F-0500 When is an inspection required? (1) Before we issue an insignia, each factory-built house, commercial structure, and component must be inspected at the manufacturing location as many times as are required by the codes. (See WAC 296-150F-0600.) Inspections may include:

(a) A "cover" inspection during construction of the unit before the electrical, plumbing, mechanical, and structural systems are covered;

(b) Insulation and vapor barrier inspection, if required;

(c) Other required code inspections;

(d) A final inspection after the factory-built house, commercial structure, or component is complete;

Note: Each factory-built house, commercial structure, and component must have a serial number to enable us to track inspections.

(2) If we discover a violation during inspection, we will issue a notice of noncompliance. You can correct the

violation during the inspection. If you cannot correct the violation during inspection, you must leave the item uncovered until we approve your correction.

(3) After a unit is manufactured but before occupancy, we must inspect a factory-built house or commercial structure if it is damaged in transit to the building site or during on-site installation. This is considered a repair inspection. (See WAC 296-150F-0240.)

(4) Approved design plans, specifications, engineering analysis or test results must be available during the inspections.

(5) Once your unit is inspected and approved we will attach the insignia.

Note: We only inspect factory-built housing and commercial structures before occupancy. After occupancy, the local enforcement agency is the inspection agency.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150F-0500, filed 10/23/96, effective 11/25/96.]

WAC 296-150F-0510 How do I request an inspection? (1) You must contact us, and we will let you know where your request for inspection should be submitted. Our address is noted in the definition of department.

(2) We must receive in-state inspection requests at least seven calendar days prior to the date that you want the inspection.

(3) We must receive out-of-state inspection requests at least fourteen calendar days prior to the date that you want the inspection.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150F-0510, filed 10/23/96, effective 11/25/96.]

WAC 296-150F-0520 What happens if my factory-built house or commercial structure passes inspection?

(1) If your factory-built house or commercial structure passes inspection and you have met the other requirements of this chapter, we will attach the insignia.

(2) After our final inspection, we will send a notice to the local enforcement agency (NLEA) indicating whether further inspection is necessary. (See WAC 296-150F-0550.)

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150F-0520, filed 10/23/96, effective 11/25/96.]

WAC 296-150F-0530 Am I charged if I request an inspection but I am not prepared? (1) If you ask us to inspect a factory-built house or commercial structure within Washington state but you are not prepared when we arrive, you must pay the minimum inspection fee and travel. (See WAC 296-150F-3000.)

(2) If you ask us to inspect a factory-built home, commercial structure, or component outside Washington state but you are not prepared when we arrive, you must pay the minimum inspection fee, travel, and per diem expenses. (See WAC 296-150F-3000.)

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150F-0530, filed 10/23/96, effective 11/25/96.]

WAC 296-150F-0540 Who inspects factory-built housing and commercial structures for installation at the building site? (1) The local enforcement agency (city or county) must approve the installation.

(2) The local enforcement agency may also request a set of design plans and specifications for the unit from you.

(3) After the unit is manufactured but before occupancy, we must inspect a factory-built house or commercial structure if it is damaged in transit to the building site or during on-site installation. This is considered a repair inspection.

Note: The local enforcement agency may not open the concealed construction of a factory-built house or commercial structure to inspect if our insignia is attached.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150F-0540, filed 10/23/96, effective 11/25/96.]

WAC 296-150F-0550 Do you notify the local enforcement agency after your final inspection of factory-built structures at a manufacturing location? After we perform a final inspection of a factory-built, commercial structure, or component, we will send a notice to the local enforcement agency (NLEA) that:

(1) Specifies what connections, standards, and incomplete items the local enforcement agency must check when the unit is installed; and/or

(2) Estimates the expected time of arrival of the factory-built house or commercial structure to the site.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150F-0550, filed 10/23/96, effective 11/25/96.]

USED FACTORY-BUILT STRUCTURES WITHOUT AN INSIGNIA

WAC 296-150F-0580 Must I obtain an insignia for used factory-built structures? All used factory-built housing and commercial structures that are to be installed on a building site in Washington state must have an insignia of approval from us prior to being installed on a building site.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150F-0580, filed 10/23/96, effective 11/25/96.]

WAC 296-150F-0590 How do I obtain insignia for used factory-built structures? We consider used factory-built housing and commercial structures as new structures for purposes of insignia approval. To obtain insignia, you must:

(1) Have the design plan approved by us (see WAC 296-150F-0300 through 296-150F-0480);

(2) Purchase insignia (see WAC 296-150F-0200 through 296-150F-0230); and

(3) Pass a unit inspection (see WAC 296-150F-0500 through 296-150F-0550).

Note: You will be required to open up as much of the construction of the unit as is necessary for inspection to show compliance with your approved design plan.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150F-0590, filed 10/23/96, effective 11/25/96.]

**CODES FOR FACTORY-BUILT HOUSING,
COMMERCIAL STRUCTURES, AND
COMPONENTS**

WAC 296-150F-0600 What manufacturing codes apply to factory-built housing and commercial structures? (1) All design, construction, installations, and alterations of factory-built housing, commercial structures, and components must conform with the following codes and the requirements of this chapter:

(a) The State Building Code, chapter 19.27 RCW;

Note: The Uniform Building Code reference to "building official" means the chief prefabricated building specialist or authorized representative at the department of labor and industries.

(b) The Energy Related Building Standards, chapter 19.27A RCW;

(c) The National Electrical Code as referenced in chapter 19.28 RCW and chapters 296-46 and 296-401 WAC.

(2) All construction methods and installations must use accepted engineering practices, provide minimum health and safety to the occupants of factory-built structures and the public, and demonstrate journeyman quality of work of the various trades.

(3) Requirements for any size, weight, or quality of material modified by the terms "minimum," "not less than," "at least," and similar expressions are minimum standards. The manufacturer may exceed these standards, provided the deviation does not result in inferior installation or defeat the purpose and intent of the standard.

Note: The codes, RCW's, and WAC's referenced in this rule are available for reference at the Washington State Library, the Washington State Law Library, and may be available at your local library.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150F-0600, filed 10/23/96, effective 11/25/96.]

**MANUFACTURER'S NOTICE TO THE
DEPARTMENT**

WAC 296-150F-0700 Must manufacturers of factory-built housing and commercial structures notify you if they manufacture at more than one location? (1) If you are manufacturing factory-built housing and commercial structures at more than one location, approved design plans must be available at each manufacturing location.

(2) You are required to send us the following information for each manufacturing location:

- (a) Company name;
 - (b) Mailing and physical address; and
 - (c) Phone and FAX number if available.
- (3) You must update this information as it changes.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150F-0700, filed 10/23/96, effective 11/25/96.]

WAC 296-150F-0710 Must manufacturers of factory-built housing and commercial structures notify you of a change in business name or address? (1) If you are moving, notify us in writing prior to a change of business name or address.

(2) Your notice must include the change of name and address.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150F-0710, filed 10/23/96, effective 11/25/96.]

WAC 296-150F-0720 Must manufacturers of factory-built housing and commercial structures notify you of a change in business ownership? (1) When a manufacturer changes ownership, the new owner must notify us in writing immediately.

(2) A new owner may continue to manufacture the units according to a prior approved design plan if the prior owner releases the design plan.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150F-0720, filed 10/23/96, effective 11/25/96.]

**FACTORY-BUILT HOUSING AND COMMERCIAL
STRUCTURE FEES**

WAC 296-150F-3000 Factory-built housing and commercial structure fees.

INITIAL FILING FEE	\$ 35.00
DESIGN PLAN FEES	
INITIAL FEE-MASTER DESIGN (CODE CYCLE)	\$170.00
INITIAL FEE-ONE YEAR DESIGN	100.00
RENEWAL FEE	35.00
RESUBMIT FEE	50.00
ADDENDUM	50.00
PLANS APPROVED BY PROFESSIONALS	35.00
DEPARTMENT INSPECTION FEES	
INSPECTION (PER HOUR)*	\$ 50.00
TRAVEL (PER HOUR)*	50.00
PER DIEM**	
HOTEL***	
MILEAGE**	
RENTAL CAR***	
PARKING***	
AIRFARE***	
NLEA CHARGE	21.00
DEPARTMENT AUDIT FEES	
AUDIT (PER HOUR)*	\$50.00
TRAVEL (PER HOUR)*	50.00
PER DIEM**	
HOTEL***	
MILEAGE**	
RENTAL CAR***	
PARKING***	
AIRFARE***	
INSIGNIA FEES	
FIRST SECTION	\$ 140.00
EACH ADDITIONAL SECTION	14.00
REISSUED-LOST/DAMAGED	35.00
TEMPORARY INSIGNIA FEES	
FIRST SECTION	\$ 140.00
EACH ADDITIONAL SECTION	14.00
REPLACEMENT FOR TEMPORARY INSIGNIA	35.00
FIELD TECHNICAL SERVICE FEE (PER HOUR)	\$50.00

* Minimum charge of 1 hour for inspection; time spent greater than 1 hour is charged in 1/2 hour increments

** Per state guidelines.

*** Actual charges incurred.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150F-3000, filed 10/23/96, effective 11/25/96.]

**Chapter 296-150M WAC
MANUFACTURED HOMES**

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- 296-150M-0310 What happens if I fail to get your approval prior to altering a manufactured home?
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- 296-150M-0350 What must the test procedures and results for design plans include?
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INSTALLATION REQUIREMENTS

INSTALLATION, PERMIT, INSPECTION, DISPUTE

- 296-150M-0600 Who establishes standards for installation of manufactured homes?
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- 296-150M-0620 Do local enforcement agencies have special requirements for installing manufactured homes in hazardous areas?
- 296-150M-0630 Who may install a manufactured home?
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- 296-150M-0700 Acceptable types of ground cover.
- 296-150M-0710 Clearance under manufactured homes.
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- 296-150M-0730 Heat pump.

MANUFACTURED HOME FEES

- 296-150M-3000 Table of manufactured home fees.

WAC 296-150M-0010 Authority, purpose, and scope. (1) This chapter is authorized by RCW 43.22.340 through 43.22.445. The law requires that any alteration to a manufactured home be approved by the department. A manufactured home with an approved alteration requires an alteration insignia. Alteration insignia can be purchased from us.

(2) The United States Department of Housing and Urban Development (HUD), manufactured housing standards division, has given us the authority to act as a manufactured home production Inspection Primary Inspection Agency (IPIA) and enforce 24 CFR 3280. As an IPIA:

- (a) We are required to inspect every manufactured home built in Washington state sometime during production;
- (b) We are authorized to audit the quality control program and the performance of quality control inspectors of manufactured home factories located in Washington state;
- (c) We are authorized to supply a HUD label to the manufacturer following our inspection and approval of the manufactured home and the manufacturer's quality control program; and
- (d) We are authorized to remove HUD labels according to the guidelines stated in the IPIA inspector's manual.

Note: A copy of our IPIA approval letter is on file at the department.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150M-0010, filed 10/23/96, effective 11/25/96.]

WAC 296-150M-0020 What definitions apply to this chapter? "Alteration" is the replacement, addition, modification, or removal of any equipment or installation that affects the construction, planning considerations, fire safety, or the plumbing, mechanical, and electrical systems of a manufactured home.

The following are not considered alterations:

- Repairs to equipment with approved parts; or
- Modification of a fuel-burning appliance according to the listing agency's specifications; or
- Adjustment and maintenance of equipment.

"Alteration insignia" is an insignia issued by the department of labor and industries to verify that an alteration to a manufactured home meets the requirements of federal law 24 CFR 3280 and this chapter.

"Anchoring system" is the means used to secure a mobile home to ground anchors or to other approved fastening devices. It may include straps, cables, turnbuckles, bolts, fasteners, and other components.

"ANSI" is the American National Standards Institute, Inc., and the institute's rules applicable to manufactured homes, ANSI A225.1 Manufactured Homes Installation, 1994 edition, except section 3.5.2 - Ground Cover and section 4.1.3.3 - Clearance.

"**Authority having jurisdiction**" means that either the department of labor and industries or the local jurisdiction is responsible for establishing specific manufactured home standards. The authority for specific manufactured home standards is divided as follows:

- The department of labor and industries establishes standards for manufactured home installation and alterations and performs alteration inspections;
- The local jurisdiction establishes standards for manufactured homes governing the building site and performs installation inspections.

"**Building site**" is a tract, parcel, or subdivision of land on which a manufactured home is installed.

"**DAPIA**" is a Design Approval Primary Inspection Agency as approved by the United States Department of Housing and Urban Development.

"**Department**" is the department of labor and industries. The department may be referred to as "we" or "us" in this chapter. Note: You may contact us at: Department of Labor and Industries, Specialty Compliance, PO Box 44440, Olympia, WA 98504-4440.

"**Design plan**" is a design submitted to the department for approval of a manufactured home structural alteration.

"**Equipment**" is all material, appliances, devices, fixtures, fittings, or accessories used in the alteration or installation of a manufactured home.

"**Footing**" is the portion of a support system that transmits loads from the manufactured home to the ground.

"**Foundation skirting**" or "**skirting**" is the material that surrounds and encloses the space under the manufactured home.

"**Homeowner**" is an individual who owns a manufactured home for the purposes of this chapter.

"**HUD**" is the United States Department of Housing and Urban Development with headquarters located in Washington, D.C.

"**Installation**" is the activity needed to prepare a building site and to set a manufactured home within that site. Site means a tract, parcel, or subdivision of land including a mobile home park.

"**IPIA**" is a manufactured home production Inspection Primary Inspection Agency approved by the United States Department of Housing and Urban Development. The department of labor and industries is the IPIA for Washington state.

"**Local enforcement agency**" is an agency of city or county government with power to enforce local regulations governing the building site and installation of a manufactured home.

"**Manufactured home**" is a single-family dwelling built according to the Department of Housing and Urban Development Manufactured Home Construction and Safety Standards Act, which is a national, preemptive building code. A manufactured home also:

- Includes plumbing, heating, air conditioning, and electrical systems;
- Is built on a permanent chassis; and
- Can be transported in one or more sections with each section at least eight feet wide and forty feet long when transported; or when installed on the site is three hundred twenty square feet or greater (see RCW 46.04.302).

Note: Total square feet is based on exterior dimensions measured after installation using the longest horizontal projections. Dimensions may not include bay windows but may include projections containing interior space such as cabinets and expandable rooms.

Exception: A structure that meets the requirements of a manufactured home as set out in 24 CFR 3282.7(u), except the size requirements is considered a manufactured home, if the manufacturer files with the secretary of HUD a certificate noted in CFR 3282.13.

"**Mobile home**" is a factory-built dwelling built prior to June 15, 1976, to standards other than the HUD Code, and acceptable under applicable state codes in effect at the time of construction or introduction of the home into the state. Mobile homes have not been built since the introduction of the HUD Manufactured Home Construction and Safety Standards Act. For the purposes of this chapter references to manufactured homes include mobile homes.

"**Park site**" is the installation location of a manufactured home within a residential area for manufactured homes.

"**Structural alteration-custom design**" is a design that can only be used once.

"**Structural alteration-master design**" is a design plan that can be used more than once. The master plan expires when there is a code change applicable to the design.

"**System**" is part of a manufactured home designed to serve a particular function such as structural, plumbing, mechanical, or electrical functions.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150M-0020, filed 10/23/96, effective 11/25/96.]

WAC 296-150M-0040 Will you keep my manufacturing information confidential? We will only release manufacturing information such as design plans for structural alterations according to the requirements of the Public Records Act. (See RCW 42.17.310 (1)(h).)

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150M-0040, filed 10/23/96, effective 11/25/96.]

WAC 296-150M-0050 Can I sell or lease a manufactured home that has been posted with a prohibited sale or lease notice? (1) If we find your manufactured home violates this chapter or federal standards in 24 CFR 3280, we may attach a prohibited sale or lease notice to your unit.

(2) You may not sell, lease, or offer for sale a manufactured home that is posted with a prohibited sale or lease notice.

(3) A prohibited sale or lease notice shall remain posted until the code violation is corrected, we inspect and approve the correction, and you pay the required fees. (See WAC 296-150M-3000.)

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150M-0050, filed 10/23/96, effective 11/25/96.]

WAC 296-150M-0060 Who handles consumer complaints about manufactured homes? The Washington state department of community, trade and economic development (CTED), office of manufactured housing section,

handles consumer complaints about manufactured homes. CTED is the state administrative agency (SAA) for the United States Department of Housing and Urban Development for the federal manufactured home program.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150M-0060, filed 10/23/96, effective 11/25/96.]

WAC 296-150M-0100 What happens if I disagree with your decision regarding my compliance with the federal standards, ANSI, or this chapter? (1) If we determine that you are in violation with the federal standards, ANSI A225.1, or this chapter, you will receive a notice of noncompliance.

(2) If you disagree with our decision, you can submit a written request for a hearing, stating why you disagree.

(3) After we receive your hearing request, we will:

(a) Schedule a hearing within thirty days after we receive your request.

(b) Notify you of the time, date, and place for the hearing. If you fail to appear, your case will be dismissed.

(c) Hear your case.

(d) Send you written notice of our decision.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150M-0100, filed 10/23/96, effective 11/25/96.]

INSIGNIA

WAC 296-150M-0200 What labels or insignia are required on my manufactured home? (1) A HUD label must be attached to the exterior of each section of a manufactured home built on or after June 15, 1976.

(2) An alteration insignia must be attached to the exterior of a manufactured home. It should be placed next to the HUD label or to the Washington state insignia.

(3) If your manufactured home does not have a HUD label or a Washington state insignia, we will attach the alteration insignia to the exterior end wall opposite the hitch end of the manufactured home. It must be placed approximately one foot above the floor line and one foot from the edge of the manufactured home.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150M-0200, filed 10/23/96, effective 11/25/96.]

WAC 296-150M-0250 How do I replace a lost or damaged insignia? (1) If an alteration insignia or a Washington state insignia is lost or damaged after it is placed on a manufactured home, you should notify us in writing immediately. You should provide the following information:

(a) Your name, address, and telephone number;

(b) The name and address of the previous owner and date of approval, if you are replacing an alteration insignia that was obtained before you purchased the manufactured home;

(c) The vehicle identification number or serial number and model;

(d) The insignia or label number if available;

(e) The design plan approval number, if available; and

(f) The insignia replacement fee and any inspection fees. (See WAC 296-150M-3000.)

Note: Washington state insignia (not HUD insignia) were attached to manufactured homes prior to June 15, 1976.

(2) After we receive your notice and payment for replacing the insignia, we may inspect your manufactured home to assure that the replacement insignia reflects compliance with your original insignia.

(3) If your home complies with your original insignia approval, we will attach a replacement alteration insignia or Washington state insignia to your manufactured home.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150M-0250, filed 10/23/96, effective 11/25/96.]

WAC 296-150M-0260 How do I replace a lost or damaged HUD label? (1) If a HUD label is lost or damaged after it is placed on a manufactured home, you should notify the manufacturer's production Inspection Primary Inspection Agency (IPIA) in writing immediately. The department of labor and industries is the IPIA for builders of manufactured homes in Washington state.

(2) If your manufactured home complies with federal standards that were in effect the date your home was built, the IPIA may replace your lost or damaged HUD label.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150M-0260, filed 10/23/96, effective 11/25/96.]

ALTERATIONS AND INSPECTIONS

ALTERATION APPROVAL

WAC 296-150M-0300 What approval do I need to alter a manufactured home? If you alter a manufactured home in Washington state, you must obtain our approval prior to making an alteration. This includes:

(1) Alterations made by an owner, or contractor; and

(2) Alterations made by a dealer after a manufactured home is sold.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150M-0300, filed 10/23/96, effective 11/25/96.]

WAC 296-150M-0310 What happens if I fail to get your approval prior to altering a manufactured home? If you alter a manufactured home without getting our approval and an alteration insignia, we may remove your Washington state insignia or HUD label and your manufactured home cannot be sold or leased.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150M-0310, filed 10/23/96, effective 11/25/96.]

WAC 296-150M-0320 What must I provide to request approval of an alteration? (1) For approval of an alteration, you must complete and return our alteration permit application form. The application must contain:

(a) A description of the proposed alteration(s);

(b) Applicable specifications, engineering data, test procedures and results; and

(c) Payment of the alteration permit fee, alteration insignia fee, and any inspection fees. (See WAC 296-150M-3000.)

(2) For approval of a structural alteration, we must approve the design plan. This is in addition to the requirements stated in subsection (1) of this section. (See WAC 296-150M-0370.)

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150M-0320, filed 10/23/96, effective 11/25/96.]

WAC 296-150M-0330 How do I obtain alteration insignia information and the forms you require? Upon request, we will provide you with the forms and the fee schedules needed to obtain an alteration insignia or you can contact any department of labor and industries office for the forms. Our address is noted in the definition of department.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150M-0330, filed 10/23/96, effective 11/25/96.]

WAC 296-150M-0340 What must an engineering analysis for design plans include? (1) The engineering analysis must show that the structural design meets the requirements of this chapter.

(2) An engineering analysis must be conducted according to accepted engineering practices and must be signed by a professional engineer or architect licensed in Washington or by a DAPIA who approved the original design plan.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150M-0340, filed 10/23/96, effective 11/25/96.]

WAC 296-150M-0350 What must the test procedures and results for design plans include? (1) Tests to an alteration design must be performed and evaluated by a professional engineer or architect licensed in Washington or by a DAPIA who approved the original design plan.

(2) Test reports must contain the following items:

(a) A description of the methods or standards that apply to the test;

(b) Drawings and a description of the item tested;

(c) A description of the test set-up;

(d) The procedure used to verify the correct load;

(e) The procedure used to measure each condition;

(f) Test data, including applicable graphs and observations of the characteristics and behavior of the item tested;

(g) Engineering data; and

(h) Analysis, comments, and conclusion.

(3) The written test procedures, results, and conclusions must reference the applicable structural alteration design plan.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150M-0350, filed 10/23/96, effective 11/25/96.]

WAC 296-150M-0360 When is design plan approval required for an alteration? (1) Design plan approval is

required when you make a structural alteration to your manufactured home.

(2) A structural alteration is a change to the body or frame of a manufactured home. For example:

(a) An alteration is made if you change the size of a room or the pitch of a roof on your manufactured home.

(b) Any addition such as a carport that adds structural load to the manufactured home and is not fully self-supporting is an alteration.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150M-0360, filed 10/23/96, effective 11/25/96.]

WAC 296-150M-0370 How do I obtain alteration design plan approval? (1) You must have your design plan approved by:

(a) A Design Approval Primary Inspection Agency (DAPIA), if they approved the initial design plan; or

(b) A professional engineer or architect who is licensed in Washington state.

(2) You must submit two copies of your alteration design plan with the appropriate fee to us for review and approval. (See WAC 296-150M-3000.)

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150M-0370, filed 10/23/96, effective 11/25/96.]

WAC 296-150M-0380 How will I know whether you have approved my design plan? (1) Your design plan will be approved if it meets the requirements of this chapter and federal standards in 24 CFR 3280.

(2) We will send you an approved copy of your design plan with the plan approval number.

(3) If your design plan is not approved, you will be notified in writing of plan deficiencies. You may send a corrected design plan to us. (See WAC 296-150M-3000.)

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150M-0380, filed 10/23/96, effective 11/25/96.]

WAC 296-150M-0390 If my design plan is not approved, how much time do I have to submit a corrected plan? (1) You have ninety days to correct and resubmit your original design plan and send us the resubmittal fee after we notify you of plan deficiencies. After ninety days, your initial design plan is returned to you.

(2) If you submit your corrected design plan after ninety days, you must send the initial design plan fee instead of the resubmittal fee. (See WAC 296-150M-3000.)

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150M-0390, filed 10/23/96, effective 11/25/96.]

WAC 296-150M-0400 How do I apply for alteration approval and obtain an alteration insignia? (1) To apply for alteration approval and the alteration insignia, you must:

(a) Complete an alteration permit form and an application for alteration insignia. We will provide the forms upon request.

(b) Submit the completed forms to us, with the inspection fee and alteration insignia fee. (See WAC 296-150M-3000.)

(2) Request inspection of your alteration at least five days before the date you want the inspection.

(3) Once we approve your alteration, we will attach the alteration insignia to your manufactured home.

Note: Specifications, engineering data, and test results should be available for our inspector. If applicable, your approved design plan must also be available during the inspection.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150M-0400, filed 10/23/96, effective 11/25/96.]

INSPECTION

WAC 296-150M-0500 When must an inspection be requested? (1) You must request an inspection by us, if you are altering a manufactured home.

(2) You must request an inspection by the local enforcement agency, for manufactured home installations.

(3) The installation of manufactured homes must be enforced and fees charged by the counties and cities in the same manner the State Building Code is enforced under RCW 19.27.050.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150M-0500, filed 10/23/96, effective 11/25/96.]

WAC 296-150M-0530 Am I charged if I request an inspection but am not prepared when you arrive? If you ask us to inspect your manufactured home or your alteration, but you are not prepared when we arrive, you must pay the minimum inspection fee. (See WAC 296-150M-3000.)

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150M-0530, filed 10/23/96, effective 11/25/96.]

INSTALLATION REQUIREMENTS

INSTALLATION, PERMIT, INSPECTION, DISPUTE

WAC 296-150M-0600 Who establishes standards for installation of manufactured homes? (1) The director of labor and industries is responsible for establishing uniform installation standards where possible and practical for persons or entities engaged in performing the installation of manufactured homes within the state.

(2) Local jurisdictions may adopt additional installation requirements only for those special situations in hazardous areas as defined in WAC 296-150M-0620.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150M-0600, filed 10/23/96, effective 11/25/96.]

WAC 296-150M-0610 What instructions are used for a manufactured home installation? The following instructions must be used for an initial or relocated manufactured home installation:

(1) Installation of a new manufactured home.

(a) The initial manufactured home installation must be conducted according to the manufacturer's instructions.

(b) If the manufacturer's instructions do not address an aspect of the installation, you may request:

(i) Specific instructions from the manufacturer; or

(ii) Specific instructions from a professional engineer or architect licensed in Washington state.

For example: (A) A manufactured home is installed over a basement and the manufacturer's instructions do not address this application;

(B) A manufactured home is installed on a site where the specific soil bearing capacity is not addressed in the manufacturer's instructions.

(c) A manufactured home must be anchored per the manufacturer's installation instructions or per the design of a professional engineer or architect licensed in Washington.

(d) A manufactured home must have a skirting around its entire perimeter. It must be installed per the manufacturer's installation or if the manufacturer is not specific, to the standards in this section. It must be vented and allow access to the under floor area per the manufacturer's installation instructions or per the standards in subsection (3) of this section.

(e) A manufactured home site must be prepared per the manufacturer's installation manual or per ANSI A225.1, 1994 edition, section 3.

(f) Heat duct crossovers must be installed per the manufacturer's installation instruction manual or per the standards in subsection (6) of this section.

(g) Dryer vents must exhaust to the exterior side of the wall or skirting.

(h) Hot water tank pressure relief lines must exhaust to the exterior side of the exterior wall or skirting and must exhaust downward.

(i) Water piping must be protected against freezing as per the manufacturer's installation instructions or by use of a heat tape listed for use with manufactured homes and installed per the heat tape manufacturer's installation instructions.

(j) The testing of water lines, waste lines, gas lines and electrical systems must be as per the manufacturer's installation instructions or per HUD standard CFR 3280.

(2) Relocation installation of a manufactured home.

(a) A relocated manufactured home installation should be conducted according to the manufacturer's instructions.

(b) If the manufacturer's instructions are unavailable, you may use:

(i) The American National Standard Institute (ANSI) standard ANSI A225.1-Manufactured Homes Installation, 1994 edition instructions; or

(ii) The instructions of a professional engineer or architect licensed in Washington state.

(c) A manufactured home must be anchored per the manufacturer's installation instructions. If the manufacturer's installation instructions are not available, you may use:

(i) The American National Standards Institute (ANSI) standard ANSI A225.1 - Manufactured Homes Installation, 1994 edition instructions; or

(ii) The instructions of a professional engineer or architect licensed in Washington state.

(d) A manufactured home must have a skirting around its entire perimeter. It must be installed per the manufacturer's installation instructions or if the manufacturer is not specific, to the standards in subsection (3) of this section.

(e) A manufactured home site must be prepared per the manufacturer's installation manual or per ANSI A225.1, 1994 edition, section 3.

(f) Heat duct crossovers must be installed per the manufacturer's installation manual, ANSI A225.1, 1994 edition, or per subsection (6) of this section.

(g) Dryer vents must exhaust to the exterior side of the wall or skirting.

(h) Hot water tank pressure relief lines must exhaust to the exterior side of the exterior wall or skirting and must exhaust downward.

(i) Water piping must be protected against freezing as per the manufacturer's installation instructions or per ANSI A225.1, section 8.

(j) The testing of water lines, waste lines, gas lines and electrical systems must be per the manufacturer's installation instructions or per HUD standard CFR 3280.

(3) Skirting must be of materials suitable for ground contact. Metal fasteners must be galvanized, stainless steel or other corrosion resistant material. Ferrous metal members in contact with the earth, other than those that are galvanized or stainless steel, must be coated with an asphaltic emulsion. Skirting must not be attached in such a manner that can cause water to be trapped between the skirting and siding or trim. The skirting must be recessed behind the siding or trim.

(4) The skirting must be vented as follows except for manufactured homes sited in a flood plain. For homes sited in a flood plain, contact the local jurisdiction for proper ventilation. Skirting must be vented by openings protected from the entrance of rodents by being covered with corrosion-resistant wire mesh with mesh openings of 1/4 inch in dimension. Such openings must have a net area of not less than one square foot for each one hundred fifty square feet of under floor area. Ventilation openings must be located as close to corners and as high as practical. Openings must be located to provide cross-ventilation on at least two opposite sides.

(5) Access to the under floor area of the manufactured home must have an opening not less than 18" x 24" and must be located so that all areas under the manufactured home are available for inspection. The cover must be of metal, pressure treated wood or vinyl.

(6) Heat duct crossovers installed to the standards in this section must be supported above the ground by strapping or blocking and be installed to avoid standing water. Heat ducts must also be installed to prevent compression and sharp bends and to minimize stress at the connections.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150M-0610, filed 10/23/96, effective 11/25/96.]

WAC 296-150M-0620 Do local enforcement agencies have special requirements for installing manufactured homes in hazardous areas? (1) Local enforcement

agencies may have special installation requirements for manufactured homes installed in hazardous areas.

(2) A hazardous area is:

(a) An area recognized as a flood plain by the local jurisdiction; or

(b) An area considered hazardous due to the probability of earthquake. We recommend that in an earthquake area you use additional measures designed by an engineer to minimize the potential effects caused by an earthquake.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150M-0620, filed 10/23/96, effective 11/25/96.]

WAC 296-150M-0630 Who may install a manufactured home? (1) A manufactured home may be installed by:

- A homeowner;
- A certified installer;
- An individual who is supervised by an on-site certified installer; or
- A specialty trades person, for certain aspects of installation.

(2) A certified installer must be a registered contractor or his or her employee, or an employee of a registered dealership. (See chapter 43.63B RCW for details to which aspects of installation require the presence of a certified installer.)

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150M-0630, filed 10/23/96, effective 11/25/96.]

WAC 296-150M-0640 Does a person who installs a manufactured home need an installation permit? (1) Any person who installs a manufactured home must obtain an installation permit from the local enforcement agency prior to installation.

(2) Any permit fees set by the local enforcement agency must be paid in full and included with the permit application.

(3) A dealer shall not deliver a manufactured home to its site without verifying that an installation permit has been obtained.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150M-0640, filed 10/23/96, effective 11/25/96.]

WAC 296-150M-0650 Does a manufactured home installation require an inspection? All manufactured home installations must be inspected and approved by the local enforcement agency.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150M-0650, filed 10/23/96, effective 11/25/96.]

WAC 296-150M-0660 What are the requirements for on-site structures and who regulates them? On-site structures, sometimes referred to as auxiliary structures, such as, but not limited to, carports, decks and steps should be self-supporting.

(1) On-site self-supporting structures that do not use any of the systems in the manufactured home are inspected by

the local enforcement agency and they should be contacted for specific on-site structure requirements.

(2) On-site structures that are not self-supporting or use one or more of the systems of the manufactured home require an inspection by us and by the local enforcement agency.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150M-0660, filed 10/23/96, effective 11/25/96.]

WAC 296-150M-0670 What happens if a dispute arises concerning an installation requirement? (1) If a dispute arises between any person, business, or local enforcement agency concerning an installation requirement of ANSI A225.1 or this chapter, the issue may be submitted to the factory assembled structures advisory (FAS) board.

(2) The board may provide an opinion on the requirement.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150M-0670, filed 10/23/96, effective 11/25/96.]

ADDITIONAL INSTALLATION REQUIREMENTS

WAC 296-150M-0700 Acceptable types of ground cover. (1) You must use a minimum of six-mil *black* polyethylene sheeting or its equivalent (exception to ANSI A225.1 (3.5.2)); or

(2) The ground cover may be omitted if the under floor area of the manufactured home has a concrete slab floor with a minimum thickness of three and one-half inches.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150M-0700, filed 10/23/96, effective 11/25/96.]

WAC 296-150M-0710 Clearance under manufactured homes. You must have a minimum clearance of eighteen inches maintained beneath the lowest member of the main frame (I-beam or channel beam) and the ground or footing. No more than twenty-five percent of the lowest member of the main frame of the home shall be less than eighteen inches above the ground or footing, and in no case shall clearance be less than twelve inches anywhere under the home. (Exception to ANSI A225.1 (4.1.3.3).)

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150M-0710, filed 10/23/96, effective 11/25/96.]

WAC 296-150M-0720 Water heater relief lines. Hot water tank pressure relief lines must be exhausted to the exterior of the foundation skirting and directed downward.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150M-0720, filed 10/23/96, effective 11/25/96.]

WAC 296-150M-0730 Heat pump. Heat pump condensation lines must be extended to the exterior.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150M-0730, filed 10/23/96, effective 11/25/96.]

MANUFACTURED HOME FEES

WAC 296-150M-3000 Table of manufactured home fees.

INITIAL FILING FEE	\$25.00
DESIGN PLAN	
STRUCTURAL ALTERATION-MASTER DESIGN (CODE CYCLE)	\$100.00
STRUCTURAL ALTERATION-ONE YEAR DESIGN	70.00
RENEWAL FEE	30.00
RESUBMIT FEE	50.00
ADDENDUM	50.00
DEPARTMENT INSPECTION FEES	
INSPECTION/REINSPECTION (PER HOUR)*	\$50.00
INSIGNIA FEES	
ALTERATION	\$25.00
REISSUED-LOST/DAMAGED	15.00
FIELD TECHNICAL SERVICE FEES(PER HOUR)*	\$50.00
IPIA	
DEPARTMENT AUDIT FEES	
PER SECTION(ONE TIME ONLY)	\$23.00
INCREASED FREQUENCY VISITS(PER HOUR)*	50.00
REINSPECTION(PER HOUR)*	50.00

NOTE: Local jurisdictions may have other fees that apply.

* Minimum charge of 1 hour for inspection; time spent greater than 1 hour is charged in 1/2 hour increments.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150M-3000, filed 10/23/96, effective 11/25/96.]

**Chapter 296-150R WAC
RECREATIONAL VEHICLES AND PARK TRAILERS**

WAC

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RECREATIONAL VEHICLE AND PARK TRAILER FEES

- 296-150R-3000 Table of recreational vehicle and park trailer fees for insignia approval.

WAC 296-150R-0010 Authority, purpose, and scope. (1) This chapter is authorized by RCW 43.22.340 through 43.22.434 and covers the requirements for:

(a) Obtaining state-plan or self-certified status if you manufacture recreational vehicles or park trailers for sale or lease in Washington state.

(b) Obtaining state-plan or self-certified insignia if you manufacture recreational vehicles or park trailers for sale or lease in Washington state.

(2) This chapter applies to:

(a) Manufacturers, dealers and individuals who build for sale, sell, or lease recreational vehicles or park trailers in Washington state; and

(b) Manufacturers, dealers, and individuals who alter recreational vehicles and park trailers for sale or lease in Washington state.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0010, filed 10/23/96, effective 11/25/96.]

WAC 296-150R-0020 What definitions apply to this chapter? "Alteration" is the replacement, addition, modification, or removal of any equipment or material that affects the fire and life safety provisions, plumbing systems, fuel systems and equipment or electrical systems of a recreational vehicle or park trailer.

The following changes are not considered alterations for purposes of this chapter:

- Repairs with approved parts;
- Modification of a fuel burning appliance according to the terms of its listing; and
- Adjustment and maintenance of equipment.

"Alteration insignia" is an insignia which indicates a vehicle alteration was approved by the department.

"ANSI" is the American National Standards Institute, Inc., and the institute's rules applicable to recreational vehicles and park trailers. For the purposes of this chapter, references to ANSI mean ANSI A119.2 Recreational Vehicles, 1996 edition, and ANSI A119.5 Park Trailers, 1993 edition, as appropriate.

"Approved" is approved by the department of labor and industries.

"Audit" by the department can be either a comprehensive audit or a performance audit. A comprehensive audit is the department inspection of a manufacturer's quality control procedures, comprehensive plans, and vehicles. A performance audit is the department's review of the manufacturer's audit performed by the industry association or other independent auditor.

"Comprehensive design plan" consists of the design plans and copies of drawings such as:

- Floor plans relating to fire and life safety, electrical, plumbing, liquefied petroleum (LP) and/or natural gas systems and appliances and air conditioning systems, if applicable to the plan of each vehicle.

- Plumbing line drawings which describe the size, length and location of gas piping lines, liquid and body waste lines, liquid and body waste tanks, and potable water tanks.
- Electrical drawings. (See WAC 296-150R-0330 and 296-150R-0820.)

"Consumer" is a person or organization who buys or leases recreational vehicles or park trailers.

"Dealer" is a person or organization whose business is offering recreational vehicles or park trailers for sale or lease.

"Department" is the department of labor and industries. The department may be referred to as "we" or "us" in this chapter. Note: You may contact us at: Department of Labor and Industries, Specialty Compliance, PO Box 44440, Olympia, WA 98504-4440.

"Equipment" is all material, appliances, fixtures, and accessories used in the manufacture or alteration of recreational vehicles or park trailers.

"Manual" is a reference containing instructions, procedures, responsibilities and other information used to implement and maintain the quality control program of a recreational vehicle or park trailer manufacturer.

"National Electrical Code" 1996 edition is the electrical code required for ANSI A119.2 compliance. The National Electrical Code 1993 edition is the electrical code required for ANSI A119.5 compliance.

"Park trailer" is a trailer-type unit that is primarily designed to provide temporary living quarters for recreational, camping or seasonal use, that meets the following criteria:

- Built on a single chassis, mounted on wheels;
- Having a gross trailer area in the set-up mode of less than 400 square feet (37.2 square meters); and
- Certified by the manufacturer as complying with ANSI A119.5.

"Quality control" is the plan and method for ensuring that the manufacture, fabrication, assembly, installation, storing, handling, and use of materials complies with this chapter and ANSI.

"Recreational vehicle" is a vehicular type unit primarily designed as temporary living quarters for recreational camping, travel, or seasonal use that either has its own motive power or is mounted on, or towed by, another vehicle. Recreational vehicles include: Camping trailers, fifth-wheel trailers, motor homes, travel trailers, and truck campers.

"Self-certification insignia" is an insignia which is obtained under the self-certification approval process.

"State-plan insignia" is an insignia which is obtained under the state design-plan approval process.

"System" is a part of a recreational vehicle or park trailer that is designed to serve a particular function such as plumbing, electrical, heating, or mechanical system.

"Vehicle" for the purposes of this chapter, is a recreational vehicle or a park trailer.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0020, filed 10/23/96, effective 11/25/96.]

WAC 296-150R-0030 How is this chapter enforced?

(1) We enforce this chapter through:

(a) The state plan insignia approval process (see WAC 296-150R-0300 through 296-150R-0720); or

(b) The self-certification insignia approval process (see WAC 296-150R-0800 through 296-150R-0930).

(2) Vehicle inspections occur where the recreational vehicles or park trailers are manufactured, sold, or leased. We conduct inspections during normal work hours or at other reasonable times. We may require you to remove a part of the recreational vehicle or park trailer in order to conduct our inspection.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0030, filed 10/23/96, effective 11/25/96.]

WAC 296-150R-0040 Will you keep my manufacturing confidential? We will only release manufacturing information, such as design plans, specifications, test results, and manuals, according to the Public Records Act. (See RCW 42.17.310 (1)(h).)

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0040, filed 10/23/96, effective 11/25/96.]

WAC 296-150R-0060 Who handles consumer complaints about recreational vehicles and park trailers?

(1) Consumers may file complaints with us, if they have reason to believe a manufacturer and/or dealer is in violation of this chapter and ANSI.

(2) The complaint should be in writing and describe the items that may not comply with this chapter and ANSI.

(3) After we receive the complaint, we will send the manufacturer and/or the dealer a copy of the complaint. The manufacturer and/or dealer has thirty days to respond to the complaint.

(4) If we decide an inspection is warranted and specific code violation(s) are found during the inspection, the manufacturer or dealer is charged for the inspection.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0060, filed 10/23/96, effective 11/25/96.]

WAC 296-150R-0100 What happens if I disagree with the department's decision regarding my compliance with this chapter and ANSI?

(1) If we determine that you are in violation of this chapter and ANSI, you will receive a notice of noncompliance and we may withdraw your certification. (See WAC 296-150R-0710, 296-150R-0920.)

(2) If you disagree with our decision, you can send us a written request for a hearing, stating why you disagree.

(3) After we receive your hearing request, we will:

(a) Schedule a hearing within thirty days after we receive your request.

(b) Notify you of the time, date, and place for the hearing. If you fail to appear, your case will be dismissed.

(c) Hear your case.

(d) Send you written notice of our decision.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0100, filed 10/23/96, effective 11/25/96.]

WAC 296-150R-0110 Do you have an advisory board to address recreational vehicle and park trailer issues? The factory assembled structures (FAS) board advises us on issues relating to plumbing, heating, electrical, installation, alterations, inspections, and rules for recreational vehicles and park trailers. (See RCW 43.22.420.)

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0110, filed 10/23/96, effective 11/25/96.]

WAC 296-150R-0120 Where can I obtain technical assistance regarding recreational vehicles and park trailers? We provide field technical service to recreational vehicle and park trailer manufacturers for an hourly fee (see WAC 296-150R-3000). Field technical service may include an evaluation, consultation, plan examination, interpretation, and clarification of technical data relating to the application of our rules. It does not include inspections.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0120, filed 10/23/96, effective 11/25/96.]

WAC 296-150R-0130 Do you allow recreational vehicles and park trailers to be displayed without an insignia? We allow one recreational vehicle or park trailer to be displayed without an insignia, if you:

(1) Get written approval from us in advance of displaying the unit; we should receive your written request at least thirty days prior to display of the unit. Your request must include:

- (a) The model and serial number of the unit;
- (b) The location where the unit will be displayed; and
- (c) The date(s) the unit will be displayed.

(2) Are licensed in Washington state through the department of licensing;

- (3) Have your approval letter available at the display;
- (4) Place three visible signs on the display unit:
 - (a) One at the main entry door;
 - (b) One inside the front of the unit; and
 - (c) One inside the back of the unit.

The signs must read: *Not For Sale - Display Only.*

The letters on the sign must be one inch or higher.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0130, filed 10/23/96, effective 11/25/96.]

REQUIREMENTS FOR INSIGNIA AND OTHER VEHICLE IDENTIFICATION

WAC 296-150R-0200 Who should obtain recreational vehicle and park trailer insignia? (1) If you manufacture recreational vehicles or park trailers to be sold or leased in Washington, you must purchase either a state-plan or self-certified insignia for each vehicle.

(2) Individuals that build recreational vehicles or park trailers to sell or lease in Washington must purchase an insignia.

(3) If you have a vehicle with either a state-plan or self-certified insignia and you plan to alter or have another person alter it, you must obtain an alteration insignia from us.

Note: You do not need to purchase our insignia if you manufacture recreational vehicles or park trailers in Washington for sale outside the state.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0200, filed 10/23/96, effective 11/25/96.]

WAC 296-150R-0210 How do I obtain insignia information and the forms you require? Upon request, we will provide you with a packet of information that includes required forms and fee schedule for obtaining the state-plan or self-certified insignia. Our address is noted in the definition of department.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0210, filed 10/23/96, effective 11/25/96.]

WAC 296-150R-0220 How do I obtain insignia based on state-plan approval? (1) If you are approved to purchase insignia based on state-plan approval, you may purchase the insignia by submitting the insignia application with the required fees. (See WAC 296-150R-3000.)

(2) The application must include:

(a) A signed statement from you certifying that you are manufacturing your units according to your approved design plans and your quality control program; and

(b) A list of the approved design plans against which you will apply the insignia.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0220, filed 10/23/96, effective 11/25/96.]

WAC 296-150R-0230 How do I obtain insignia based on self-certification approval? If you are approved to purchase insignia based on self-certification approval, you may purchase the insignia by submitting the insignia application with the required fees. (See WAC 296-150R-3000.) The application must include the design plan with a signed statement from you certifying that you are manufacturing your units according to your comprehensive design plans and your quality control program.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0230, filed 10/23/96, effective 11/25/96.]

WAC 296-150R-0250 How do I replace lost or damaged insignia? (1) If an insignia is lost or damaged after it is placed on a recreational vehicle or park trailer and you are the manufacturer or owner, you must notify us in writing immediately.

(2) Your notification should include the following information:

(a) Your name, address, and telephone number;

(b) The vehicle identification number or serial number and model;

(c) The insignia number and design-plan approval number, if applicable; and

(d) The required fee. (See WAC 296-150R-3000.)

(3) If we can determine that your unit previously had an insignia, we will attach the insignia to your vehicle once we receive your insignia fee. (See WAC 296-150R-3000.)

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0250, filed 10/23/96, effective 11/25/96.]

WAC 296-150R-0280 What other vehicle identification is required? Every *new* recreational vehicle or park trailer manufactured, offered for sale or lease, or sold or leased in Washington must also have a vehicle identification number (VIN) label in compliance with the Federal Department of Transportation (DOT) safety standards.

Note: Truck campers do not require a vehicle identification number (VIN). They have a manufacturer's serial number.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0280, filed 10/23/96, effective 11/25/96.]

WAC 296-150R-0290 When and where should the insignia and the vehicle identification label be attached to the vehicle? (1) Insignia must be attached to the finished vehicle before it leaves the approved manufacturer's location.

(2) The state-plan or self-certification insignia must be attached adjacent to the main door, on the strike side of the door, at least twelve inches above the floor line. The strike side of the door is opposite the hinge side of the door.

(3) The alteration insignia must be attached next to the certification insignia.

(4) The vehicle identification number (VIN) label must be attached on the vehicle as required by the Federal Department of Transportation. Any other vehicle identification label must be attached next to the certification insignia or on the exterior front half of the left side of the vehicle, at least six inches above the floor line.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0290, filed 10/23/96, effective 11/25/96.]

STATE PLAN

WAC 296-150R-0300 What is required to obtain insignia based on state-plan approval? If you want to obtain insignia based on state-plan approval, you must:

(1) Have your design plan and quality control manual approved by us; and

(2) Pass a quality control program comprehensive audit which includes a random inspection of your vehicles.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0300, filed 10/23/96, effective 11/25/96.]

WAC 296-150R-0310 What is required after I am approved as a state-plan manufacturer? Once you have obtained approval as a state-plan manufacturer:

(1) You are required to submit comprehensive design plans to us for approval;

(2) You can inspect your own vehicles based upon your quality control manual specifications; and

(3) You are subject to an annual comprehensive audit at your manufacturing location(s).

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0310, filed 10/23/96, effective 11/25/96.]

DESIGN PLAN

WAC 296-150R-0320 How do I apply for design-plan approval? Upon request, we will send you a design-plan approval request form.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0320, filed 10/23/96, effective 11/25/96.]

WAC 296-150R-0330 What is required for comprehensive design-plan approval? If you are the manufacturer applying for state-plan approval:

(1) You must submit two sets of comprehensive design plans (do not send originals) to us for approval. Design plans must be accompanied by the initial filing fee, if appropriate, and the design plan fee. (See WAC 296-150R-3000.)

(2) Your comprehensive design plan must indicate compliance with the appropriate ANSI standards in the following plans and drawings:

(a) Floor plans relating to fire and life safety, electrical, plumbing, liquefied petroleum (LP) and/or natural gas systems and appliances, and air conditioning systems, if applicable, of each vehicle.

(b) Plumbing line drawings which describe the size, length and location of gas piping lines, liquid and body waste lines, liquid and body waste tanks, and potable water tanks.

(c) Electrical drawings.

Note: We will provide a check list with detailed requirements for each type of plan upon request.

(3) Current comprehensive design plans must be available at each manufacturing location.

(4) You must have an approved quality control manual. (See WAC 296-150R-0400, 296-150R-0410.)

Note: You do not need a quality control manual if you are an individual asking us to inspect a vehicle.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0330, filed 10/23/96, effective 11/25/96.]

WAC 296-150R-0340 What happens if you approve my design plan? (1) Your design plan will be approved if it complies with the requirements of this chapter and ANSI.

(2) We will send you an approved copy of the design plan with the approval number.

(3) You must keep copies of the approved design plan for all models produced at the manufacturing location.

(4) If your design plan is not approved, you will be notified in writing of plan deficiencies. You may send a corrected design plan to us.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0340, filed 10/23/96, effective 11/25/96.]

WAC 296-150R-0350 If my design plan is not approved, how much time do I have to submit a correct-

ed plan? (1) You have ninety days to correct and resubmit your original design plan and send us the resubmittal fee once we notify you of plan deficiencies. After ninety days, your initial design plan is returned to you.

(2) If you submit your corrected design plan after ninety days, you must send the initial design plan fee instead of the resubmittal fee. (See WAC 296-150R-3000.)

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0350, filed 10/23/96, effective 11/25/96.]

QUALITY CONTROL PROGRAM/MANUAL

WAC 296-150R-0400 What constitutes an acceptable quality control program/manual for state-plan insignia? Your quality control program must implement your approved quality control manual. The quality control manual must provide instructions, procedures, and assign responsibilities to assure quality control requirements are met when vehicles are manufactured. The minimum quality control manual requirements are:

(1) An organization chart which identifies quality assurance positions and describes quality control responsibilities and accountability for the following plant personnel: General manager, plant production manager, plant foreperson, lead persons, production, quality control, sales, engineering, purchasing, and receiving staff;

(2) A method to distribute all comprehensive design plans and installation instructions or other documentation that ensures all products used are installed correctly in all recreational vehicle or park trailer models produced at each manufacturing location;

(3) Procedures for maintaining the quality assurance of each vehicle model;

(4) Drawings and procedures displaying manufacturing processes including a schematic plant layout;

(5) Descriptions of production stations, including surge-hold stations, on-site or off-site repair-rework locations, and off-line construction sites. Descriptions should identify by station and location the work, tests, or inspections performed and the job title of the person performing the quality control review;

(6) Inspection and equipment maintenance instructions, including jig maintenance, check-off lists, and other documentation verifying quality control performance and accountability;

(7) Coordination of staff duties ensuring smooth transition of manufacturing responsibilities during the shift change;

(8) Instructions regarding the identification, control, and handling of damaged goods or materials that do not comply with existing rules and ANSI;

(9) Information about recreational vehicle and park trailer material storage and environmental control including protection from the weather and the elimination of scrap and age-dated materials which have exceeded their life;

(10) Verification that testing equipment is properly calibrated and that your gauges are accurate;

(11) Information about production line testing which includes descriptions of procedures, test equipment, and the location of each test. The information should demonstrate

accountability for test completion, for rework and repair, and for retesting;

(12) Instructions, procedures, descriptions, and responsibilities for insignia storage, security, application, and inventory;

(13) Procedures for mixed production lines, for variable production rates, for new or substitute personnel, and for new or changed inspections and tests;

(14) Instructions, procedures, and responsibilities for keeping vehicle records which include the unit serial number, model, plan approval number, dealer location or destination, insignia number, inspection, and test results;

(15) Information about your quality control training program; and

(16) Procedures for introducing new designs, models, materials and equipment to staff that ensures products are built according to the standards and the manufacturer's instructions.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0400, filed 10/23/96, effective 11/25/96.]

WAC 296-150R-0410 How do I apply to have my quality control manual approved? We will provide the form and instructions upon request.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0410, filed 10/23/96, effective 11/25/96.]

WAC 296-150R-0420 What happens if my quality control manual is approved? (1) Your quality control manual will be approved if it meets the requirements of this chapter and ANSI.

(2) We will send you an approved copy of your quality control manual.

(3) If your quality control manual is not approved, you will be notified in writing of the deficiencies. You may send us a corrected quality control manual.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0420, filed 10/23/96, effective 11/25/96.]

DESIGN PLAN/QUALITY CONTROL MANUAL— REVIEW, CHANGE/ADDENDUM, EXPIRATION, AND RENEWAL

WAC 296-150R-0440 Do I need approval to change my design plan or quality control manual after I receive state-plan approval? (1) Once you have received state-plan approval and you want to change your design plan or quality control manual, we must approve the changes/addendums.

(2) You should send design plan or quality control manual changes to us thirty days before you want the changes/addendums to take effect.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0440, filed 10/23/96, effective 11/25/96.]

WAC 296-150R-0450 When does state-plan insignia approval expire? As a state-plan manufacturer, your approval for insignia is based upon approval of your design

plan and quality control manual. Design plans are considered approved until a new ANSI code edition is adopted or unless revisions to ANSI prior to code changes would not support our design plan approval.

Note: ANSI codes are normally adopted for a three-year period.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0450, filed 10/23/96, effective 11/25/96.]

INSPECTION

WAC 296-150R-0600 When does a manufacturer, individual builder, or a dealer need to request a vehicle inspection? If you are a manufacturer, individual builder, or a dealer, you must request a vehicle inspection by us:

- (1) If you have approval of your design plan and quality control manual and need to complete the state-plan process;
- (2) If you are making a vehicle alteration which must be inspected and approved by us; or
- (3) If you are correcting a violation which must be inspected and approved by us.

Note: An individual who is building a vehicle to own, sell, or lease must obtain a vehicle identification number from the state patrol prior to our issuance of certification insignia.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0600, filed 10/23/96, effective 11/25/96.]

WAC 296-150R-0610 How do I request a vehicle inspection and what documentation is required? (1) Complete an inspection application which can be obtained from us.

(2) Send the completed application, application fee, and inspection fee to us prior to the date you would like an inspection performed. (See WAC 296-150R-3000.)

(3) During the inspection, have your approved design plans, specifications, and test results available for our inspector.

(4) A vehicle inspection will be completed in two phases. The "cover" inspection during the construction of the unit before the electrical, plumbing, mechanical, heating, and structural systems are covered. The final inspection takes place after the vehicle is complete.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0610, filed 10/23/96, effective 11/25/96.]

WAC 296-150R-0620 What happens if my vehicle passes inspection? (1) If your vehicle passes inspection and you have met the other requirements of this chapter and ANSI, you will be approved to purchase state-plan insignia from us.

(2) If you send your insignia application and fee to us prior to the inspection, we will attach your insignia when we approve the vehicle.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0620, filed 10/23/96, effective 11/25/96.]

WAC 296-150R-0630 What happens if my vehicle does not pass inspection? (1) If your vehicle does not pass inspection, you will receive a notice of noncompliance.

(2) You have ten days after receiving the notice of noncompliance to send us a written response explaining how you will correct the violation(s) and prevent its reoccurrence.

(3) You are not allowed to move, sell or lease a vehicle until:

- (a) You correct the violation(s);
- (b) We inspect and approve the correction(s); and
- (c) You pay the inspection fee and the insignia fee, if required. (See WAC 296-150R-3000.)

(4) If you fail to make the corrections, the sale or lease of your vehicle is prohibited by RCW 43.22.340 until the corrections are made.

Note: You will be allowed to return a vehicle to the manufacturing location or to another location for correction with our approval.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0630, filed 10/23/96, effective 11/25/96.]

WAC 296-150R-0640 Am I charged if I request an inspection but I am not prepared? (1) If you ask us to inspect recreational vehicles or park trailers within Washington state but are not prepared when we arrive, you must pay the minimum inspection fee and travel.

(2) If you ask us to inspect recreational vehicles or park trailers outside Washington state but are not prepared when we arrive, you must pay the minimum inspection fee, travel, and per diem expenses.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0640, filed 10/23/96, effective 11/25/96.]

AUDIT

WAC 296-150R-0700 What does our annual quality control program audit for state-plan insignia include?

(1) During your annual comprehensive audit for state-plan insignia, we will review your quality control program and randomly inspect your vehicles.

(2) If our comprehensive audit indicates that you are complying with the requirements of this chapter and ANSI, you may purchase state-plan insignia.

(3) If we discover a quality control program deficiency or a vehicle violation during our comprehensive audit, you will receive a notice of noncompliance and cannot purchase state-plan insignia until the deficiency or violation is corrected.

(a) You can correct the deficiency or violation during the comprehensive audit; or

(b) You have fourteen days after receiving the notice of noncompliance to send us a written response explaining your correction of the deficiency or violation;

(c) You are subject to a follow-up comprehensive audit.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0700, filed 10/23/96, effective 11/25/96.]

LOSS OF STATE-PLAN APPROVAL

WAC 296-150R-0710 Can you withdraw my state-plan insignia approval? Should you fail to meet the requirements of this chapter and ANSI after you have been approved to purchase state-plan insignia, we will withdraw your certification.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0710, filed 10/23/96, effective 11/25/96.]

WAC 296-150R-0720 What happens if my state-plan insignia approval is withdrawn? If your state-plan insignia approval is withdrawn because you have failed to comply with this chapter and ANSI:

- (1) You must return any issued but unused insignia to us; and
- (2) You cannot sell or lease vehicles in Washington.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0720, filed 10/23/96, effective 11/25/96.]

SELF-CERTIFICATION**AUDIT TO RECEIVE SELF-CERTIFICATION**

WAC 296-150R-0800 What is required for self-certification? If you want to be self-certified, you must:

- (1) Send us a written request for self-certification;
- (2) Have us approve your self-certification quality control manual;
- (3) Have us approve your comprehensive design plans for the current models you sell in Washington state if you do not already have approved design plans;
- (4) Initially be audited by us, and then be audited at least every six months by an industry association or independent inspection auditor who conducts quality control audits;
- (5)(a) The manufacturer must designate an industry association or other independent auditor to perform audits of the manufacturer at least every six months.

(b) The manufacturer must provide written approval from the auditor designated under (a) of this subsection and provide a copy of such approval to the department. The approval form must allow us to review all documentation and information collected by the auditor during the auditor's periodic audits of the manufacturer. The department shall conduct a performance audit of the industry association or other independent inspection auditor at least once every two years.

(c) If the designated auditor refuses to allow the department to conduct a performance audit, then the department may conduct a performance audit of the manufacturer's quality control program. If both the designated auditor and manufacturer refuse to allow a performance audit, then the department may conduct a comprehensive audit as authorized by RCW 43.22.355(4).

Note: If you do not use an industry association or independent inspection auditor to conduct your quality control audits, you may apply for insignia under the state-plan process for insignia approval.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0800, filed 10/23/96, effective 11/25/96.]

WAC 296-150R-0810 What does the initial self-certification audit include? During the initial self-certification comprehensive audit, we will:

- (1) Review your quality control program;
- (2) Review your comprehensive design plans; and
- (3) Randomly inspect your vehicles.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0810, filed 10/23/96, effective 11/25/96.]

WAC 296-150R-0820 How will I know if I am approved for self-certification? (1) If the initial self-certification comprehensive audit indicates that you are complying with this chapter and ANSI, we will send you a self-certification approval letter. Once you are approved as self-certified you may purchase self-certification insignia.

(2) If we discover a quality control program deficiency or a vehicle violation during our initial audit, you will receive a notice of noncompliance and cannot purchase the self-certification insignia until the deficiency or violation is corrected.

(a) You can correct the deficiency or violation during the audit; or

(b) You have fourteen days after receiving the notice of noncompliance to send us a written response explaining your correction of the deficiency or violation;

(c) You are subject to a follow-up comprehensive audit, to verify correction of the deficiency or violation.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0820, filed 10/23/96, effective 11/25/96.]

WAC 296-150R-0830 What are the self-certification fees? (1) If you are a new manufacturer applying for self-certification, you must pay the initial filing fee, the quality control manual fee, the audit fee, travel and per diem expenses.

(2) If you are a current state-plan manufacturer applying for self-certification who has approved design plans with the department, you must pay the self-certification quality control manual fee, the audit fee, travel and per diem expenses.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0830, filed 10/23/96, effective 11/25/96.]

SELF-CERTIFICATION COMPREHENSIVE DESIGN PLAN/QUALITY CONTROL PROGRAM/QUALITY CONTROL MANUAL

WAC 296-150R-0840 What is required for comprehensive design plan approval for self-certification? (1) If you are a *new manufacturer* applying for self-certification:

(a) You must send us two sets of comprehensive design plans (do not send originals) for approval. Design plans must be accompanied by the appropriate fees. (See WAC 296-150R-3000.)

(b) Your comprehensive design plan must indicate compliance with the appropriate ANSI standards in the following plans and drawings:

(i) Floor plans relating to fire and life safety, electrical, plumbing, liquefied petroleum (LP) and/or natural gas systems and appliances, and air conditioning systems, if applicable to the plan of each vehicle.

(ii) Plumbing line drawings which describe the size, length and location of gas piping lines, liquid and body waste lines, liquid and body waste tanks, and potable water tanks.

(iii) Electrical drawings.

Note: We will provide you with a check list with detailed requirements for each type of plan upon request.

(c) Current comprehensive design plans must be available at each manufacturing location.

(2) If you are a state-plan approved manufacturer applying for self-certification, you must have approved comprehensive design plans on file with us and at each manufacturing location.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0840, filed 10/23/96, effective 11/25/96.]

WAC 296-150R-0850 What constitutes an acceptable quality control program/manual for self-certification? Your quality control program must implement your approved quality control manual. The quality control manual must provide instructions, procedures, and assign responsibilities to assure quality control expectations are met when vehicles are manufactured. The minimum quality control manual requirements are:

(1) An organization chart which identifies quality assurance positions and describes quality control responsibilities and accountability for the following plant personnel: General manager, plant production manager, plant foreperson, lead persons, production, quality control, sales, engineering, purchasing and receiving staff;

(2) A method to distribute all comprehensive design plans and installation instructions or other documentation that ensures all products used are installed correctly in all recreational vehicle or park trailer models produced at each manufacturing location;

(3) Procedures for maintaining the quality assurance of each vehicle model;

(4) Drawings and procedures displaying manufacturing processes including a schematic plant layout;

(5) Descriptions of production stations, including surge-hold stations, on-site or off-site repair-rework locations, and off-line construction sites. Descriptions should identify by station and location the work, tests, or inspections performed and the job title of the person performing the quality control review;

(6) Inspection and equipment maintenance instructions, including jig maintenance, check-off lists, and other documentation verifying quality control performance and accountability;

(7) Coordination of staff duties ensuring smooth transition of manufacturing responsibilities during the shift change;

(8) Instructions regarding the identification, control, and handling of damaged goods or materials that do not comply with existing rules and ANSI;

(9) Information about recreational vehicle and park trailer material storage and environmental control including protection from the weather and the elimination of scrap and age-dated materials which have exceeded their life;

(10) Verification that testing equipment is properly calibrated and that your gauges are accurate;

(11) Information about production line testing which includes descriptions of procedures, test equipment, and the location of each test. The information should demonstrate accountability for test completion, for rework and repair, and for retesting;

(12) Instructions, procedures, descriptions, and responsibilities for insignia storage, security, application, and inventory;

(13) Procedures for mixed production lines, for variable production rates, for new or substitute personnel, and for new or changed inspections and tests;

(14) Instructions, procedures, and responsibilities for keeping vehicle records which include the unit serial number, model, plan approval number (if applicable), dealer location or destination, insignia number, inspection, and test results;

(15) Information about your quality control training program;

(16) Procedures for introducing new designs, models, materials and equipment to staff that ensures products are built according to the standards and the manufacturer's instructions; and

(17) Written authorization as required in WAC 296-150R-0800(5).

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0850, filed 10/23/96, effective 11/25/96.]

WAC 296-150R-0860 After becoming self-certified, do I need approval to change my comprehensive design plan? (1) Once you are self-certified, you are not required to send us your comprehensive design plans nor are we required to approve your comprehensive design plan changes.

(2) You are required to maintain your comprehensive design plans for each model at each manufacturing location where the models are produced.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0860, filed 10/23/96, effective 11/25/96.]

WAC 296-150R-0870 After becoming self-certified, do I need approval to change my quality control manual? Once you are self-certified, you are required to have any changes to your quality control manual approved by us.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0870, filed 10/23/96, effective 11/25/96.]

AUDIT AFTER SELF-CERTIFICATION

WAC 296-150R-0900 When do you audit self-certified manufacturers? (1) We audit self-certified manufacturers, if we have reason to believe, you are not complying with this chapter and ANSI.

(2) Reasons to believe that you may not be complying with this chapter and ANSI may include, but are not limited to:

(a) Consolidation of manufacturing locations or relocation of your manufacturing plant;

(b) Complaints from dealers, consumers, or other interested parties that you are not complying with this chapter and ANSI;

(c) Change of business ownership; or

(d) Noncompliance with the requirements of this chapter.

(3) A comprehensive or performance audit based on WAC 296-150R-0800 (5)(c).

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0900, filed 10/23/96, effective 11/25/96.]

WAC 296-150R-0910 After I am self-certified, what does an audit include? A performance audit after you are self-certified includes:

(1) A review of your quality control program;

(2) Verification that you are manufacturing vehicles according to this chapter and ANSI; and

(3) Verification that your comprehensive design plans are available at all locations where the vehicles are manufactured.

Note: Our audit may include a review of the comprehensive design plans at your manufacturing location.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0910, filed 10/23/96, effective 11/25/96.]

LOSS OF SELF-CERTIFICATION

WAC 296-150R-0920 Can you withdraw my self-certification? Should you fail to meet the requirements of this chapter and ANSI after you have been approved for self-certification, your self-certification can be withdrawn.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0920, filed 10/23/96, effective 11/25/96.]

WAC 296-150R-0930 What happens if my self-certification is withdrawn? If your self-certification is withdrawn because you have failed to comply with this chapter and ANSI:

(1) You must return any issued but unused insignia to us; and

(2) You cannot sell or lease vehicles in Washington.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-0930, filed 10/23/96, effective 11/25/96.]

VEHICLE ALTERATIONS

WAC 296-150R-1000 Who needs approval to alter a recreational vehicle or park trailer? (1) Any alteration by a manufacturer, dealer, or individual to a vehicle with state-certified insignia must be approved by us before the alteration is made. "Alteration" is defined in WAC 296-150R-0020.

(2) Any alteration by a manufacturer, dealer, or individual to a vehicle with self-certified insignia after it leaves the manufacturer's location must be approved by us before the alteration is made.

Note: We may remove your insignia if you alter or have someone alter a vehicle without our approval.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-1000, filed 10/23/96, effective 11/25/96.]

WAC 296-150R-1010 Must I purchase a separate insignia for an alteration? You are required to purchase an alteration insignia from us.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-1010, filed 10/23/96, effective 11/25/96.]

WAC 296-150R-1020 How do I apply for alteration approval and obtain the alteration insignia? (1) To apply for alteration approval and the alteration insignia, you must:

(a) Complete an alteration permit form and an application for alteration insignia. We will provide the forms.

(b) Submit the completed forms, with the inspection fee and altered vehicle insignia fee, to us. (See WAC 296-150R-3000.)

(2) Our vehicle inspection of the alteration will be in two phases. The "cover" inspection during the alteration of the unit before the electrical, plumbing, mechanical, heating, or other systems are covered. The final inspection takes place after the vehicle is complete.

(3) Once we approve your alteration, we will attach the alteration insignia.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-1020, filed 10/23/96, effective 11/25/96.]

MANUFACTURER'S NOTICE TO THE DEPARTMENT

WAC 296-150R-2000 Must state-plan and self-certified manufacturers notify you if they manufacture at more than one location? (1) We must approve each recreational vehicle and park trailer manufacturing location producing units for sale or lease in Washington state.

(2) You must send us the following information for each manufacturing location when you are certified:

(a) Company name;

(b) Mailing and physical address;

(c) Phone and FAX number if available;

(d) Type of recreational vehicle(s) manufactured;

(e) Contact person for plan review; and

(f) Contact person for plant audit.

(3) You must update the information as it changes.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-2000, filed 10/23/96, effective 11/25/96.]

WAC 296-150R-2010 Must state-plan and self-certified manufacturers notify you if they change a business name or address? (1) If you are moving your business from an approved manufacturing location, the new location must be approved before shipping units from that location for sale or lease in Washington state.

(2) You must notify us in writing prior to a change of business name or address.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-2010, filed 10/23/96, effective 11/25/96.]

WAC 296-150R-2020 Must state-plan and self-certified manufacturers notify you of a change in business ownership? (1) When a recreational vehicle or park trailer manufacturing business changes ownership, the new owner must notify us in writing immediately.

(2) A new owner may continue to manufacture vehicles using approved design plans or comprehensive design plans according to this chapter.

(3) The department will perform a comprehensive audit of the manufacturer after the ownership change to ensure you are meeting the requirements of this chapter and ANSI.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-2020, filed 10/23/96, effective 11/25/96.]

WAC 296-150R-2030 Must state-plan and self-certified manufacturers notify you of their Washington dealers? (1) You must send us the following information about yourself and each of your Washington dealers when you are certified:

- (a) Dealership name;
- (b) Mailing and physical address;
- (c) Phone and FAX number if available;
- (d) Type of recreational vehicle(s); and
- (e) Contact person.

(2) You must update this information as it changes.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-2030, filed 10/23/96, effective 11/25/96.]

RECREATIONAL VEHICLE AND PARK TRAILER FEES

WAC 296-150R-3000 Table of recreational vehicle and park trailer fees for insignia approval.

STATE PLAN		SELF CERTIFICATION	
INITIAL FILING FEE	\$25.00	INITIAL FILING FEE	\$25.00

DESIGN PLAN		DESIGN PLAN	
NEW PLAN REVIEW FEE	\$70.00	NEW PLAN REVIEW FEE (ONE TIME FEE)	\$70.00
RESUBMIT FEE	50.00	RESUBMIT FEE	50.00
ADDENDUM	50.00	ADDENDUM	50.00

STATE PLAN/MANUAL FEES		SELF CERTIFICATION/MANUAL FEES	
INITIAL APPROVAL	\$10.00	INITIAL APPROVAL	\$10.00
RESUBMITTAL	50.00	RESUBMITTAL	50.00
ADDENDUM	50.00	ADDENDUM	50.00

DEPARTMENT AUDIT FEES		DEPARTMENT AUDIT FEES	
AUDIT (PER HOUR)*	\$50.00	AUDIT (PER HOUR)*	\$50.00
TRAVEL (PER HOUR)*	50.00	TRAVEL (PER HOUR)*	50.00
PER DIEM**		PER DIEM**	
HOTEL***		HOTEL***	
MILEAGE**		MILEAGE**	
RENTAL CAR***		RENTAL CAR***	
PARKING***		PARKING***	
AIRFARE***		AIRFARE***	

DEPARTMENT INSPECTION FEES		DEPARTMENT INSPECTION FEES	
INSPECTION (PER HOUR)*	\$50.00	INSPECTION (PER HOUR)*	\$50.00
TRAVEL (PER HOUR)*	50.00	TRAVEL (PER HOUR)*	50.00
PER DIEM**		PER DIEM**	
HOTEL***		HOTEL***	
MILEAGE**		MILEAGE**	
RENTAL CAR***		RENTAL CAR***	
PARKING***		PARKING***	
AIRFARE***		AIRFARE***	

INSIGNIA FEES		INSIGNIA FEES	
STATE CERTIFIED	\$10.00	SELF CERTIFIED	\$10.00
ALTERATION	25.00	ALTERATION	25.00
REISSUED-LOST/DAMAGED	10.00	REISSUED-LOST/DAMAGED	10.00

FIELD TECHNICAL SERVICE FEE (PER HR.)	\$50.00
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* Minimum charge of 1 hour for inspection; time spent greater than 1 hour is charged in 1/2 hour increments

** Per state guidelines.

***Actual charges incurred.

[Statutory Authority: RCW 43.22.340, [43.22.]355, [43.22.]360, [43.22.]432, [43.22.]440 and [43.22.]480. 96-21-146, § 296-150R-3000, filed 10/23/96, effective 11/25/96.]

Chapter 296-155 WAC

SAFETY STANDARDS FOR CONSTRUCTION
WORK

WAC

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- 296-155-48511 Table J-9.
- 296-155-48512 Table J-10.
- 296-155-48513 Table J-11.
- 296-155-48514 Table J-12.
- 296-155-48515 Table J-13.
- 296-155-48516 Table J-14.
- 296-155-48517 Table J-15.
- 296-155-48518 Table J-16.
- 296-155-48519 Table J-17.
- 296-155-48523 Manually propelled mobile ladder stands and scaffolds (towers).
- 296-155-48525 Manually propelled elevating work platforms.
- 296-155-48527 Self propelled elevating work platforms.
- 296-155-48529 Boom supported elevating work platforms.
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- 296-155-500 Definitions applicable to this part.
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- 296-155-50503 Roofing brackets.
- 296-155-50505 Reserved.
- 296-155-510 Reserved.
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296-155-570	Rigging—Wire rope.
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296-155-66407	Appendix D—Aluminum hydraulic shoring for trenches.
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296-155-950	Rollover protective structures (ROPS) for material handling equipment.
296-155-955	Minimum performance criteria for rollover protective structures for designated scrapers, loaders, dozers, graders, and crawler tractors.
296-155-960	Protective frame (ROPS) test procedures and performance requirements for wheel-type agricultural and industrial tractors used in construction.

296-155-965 Overhead protection for operators of agricultural and industrial tractors.

**DISPOSITION OF SECTIONS FORMERLY
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- 296-155-175 Scope and application. [Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-155-175, filed 4/27/87.] Repealed by 87-24-051 (Order 87-24), filed 11/30/87. Statutory Authority: Chapter 49.17 RCW.
- 296-155-17505 Definitions. [Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-155-17505, filed 4/27/87.] Repealed by 87-24-051 (Order 87-24), filed 11/30/87. Statutory Authority: Chapter 49.17 RCW.
- 296-155-17510 Permissible exposure limits (pel). [Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-155-17510, filed 4/27/87.] Repealed by 87-24-051 (Order 87-24), filed 11/30/87. Statutory Authority: Chapter 49.17 RCW.
- 296-155-17515 Communication among employers. [Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-155-17515, filed 4/27/87.] Repealed by 87-24-051 (Order 87-24), filed 11/30/87. Statutory Authority: Chapter 49.17 RCW.
- 296-155-17520 Identification. [Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-155-17520, filed 4/27/87.] Repealed by 87-24-051 (Order 87-24), filed 11/30/87. Statutory Authority: Chapter 49.17 RCW.
- 296-155-17525 Regulated areas. [Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-155-17525, filed 4/27/87.] Repealed by 87-24-051 (Order 87-24), filed 11/30/87. Statutory Authority: Chapter 49.17 RCW.
- 296-155-17530 Exposure monitoring. [Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-155-17530, filed 4/27/87.] Repealed by 87-24-051 (Order 87-24), filed 11/30/87. Statutory Authority: Chapter 49.17 RCW.
- 296-155-17532 Methods of compliance. [Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-155-17532, filed 4/27/87.] Repealed by 87-24-051 (Order 87-24), filed 11/30/87. Statutory Authority: Chapter 49.17 RCW.
- 296-155-17535 Respiratory protection. [Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-155-17535, filed 4/27/87.] Repealed by 87-24-051 (Order 87-24), filed 11/30/87. Statutory Authority: Chapter 49.17 RCW.
- 296-155-17540 Protective clothing. [Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-155-17540, filed 4/27/87.] Repealed by 87-24-051 (Order 87-24), filed 11/30/87. Statutory Authority: Chapter 49.17 RCW.
- 296-155-17545 Hygiene facilities and practices. [Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-155-17545, filed 4/27/87.] Repealed by 87-24-051 (Order 87-24), filed 11/30/87. Statutory Authority: Chapter 49.17 RCW.
- 296-155-17550 Communication of hazards to employees. [Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-155-17550, filed 4/27/87.] Repealed by 87-24-051 (Order 87-24), filed 11/30/87. Statutory Authority: Chapter 49.17 RCW.
- 296-155-17555 Housekeeping. [Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-155-17555, filed 4/27/87.] Repealed by 87-24-051 (Order 87-24), filed 11/30/87. Statutory Authority: Chapter 49.17 RCW.
- 296-155-17560 Medical surveillance. [Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-155-17560, filed 4/27/87.] Repealed by 87-24-051 (Order 87-24), filed 11/30/87. Statutory Authority: Chapter 49.17 RCW.
- 296-155-17565 Recordkeeping. [Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-155-17565, filed 4/27/87.] Repealed by 87-24-051 (Order 87-24), filed 11/30/87. Statutory Authority: Chapter 49.17 RCW.
- 296-155-17570 Dates. [Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-155-17570, filed 4/27/87.] Repealed by 87-24-051 (Order 87-24), filed 11/30/87. Statutory Authority: Chapter 49.17 RCW.
- 296-155-17575 Appendices. [Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-155-17575, filed 4/27/87.] Repealed by 87-24-051 (Order 87-24), filed 11/30/87. Statutory Authority: Chapter 49.17 RCW.
- 296-155-177 Appendix A—WISHA reference method—Mandatory. [Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-155-177, filed 4/27/87.] Repealed by 87-24-051 (Order 87-24), filed 11/30/87. Statutory Authority: Chapter 49.17 RCW.
- 296-155-179 Appendix B—Detailed procedure for asbestos, tremolite, anthophyllite, and actinolite sampling and analysis—Nonmandatory. [Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-155-179, filed 4/27/87.] Repealed by 87-24-051 (Order 87-24), filed 11/30/87. Statutory Authority: Chapter 49.17 RCW.
- 296-155-181 Appendix C—Qualitative and quantitative fit testing procedures—Mandatory. [Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-155-181, filed 4/27/87.] Repealed by 87-24-051 (Order 87-24), filed 11/30/87. Statutory Authority: Chapter 49.17 RCW.
- 296-155-183 Appendix D—Medical questionnaires—Mandatory. [Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-155-183, filed 4/27/87.] Repealed by 87-24-051 (Order 87-24), filed 11/30/87. Statutory Authority: Chapter 49.17 RCW.
- 296-155-185 Appendix E—Interpretation and classification of chest roentgenograms—Mandatory. [Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-155-185, filed 4/27/87.] Repealed by 87-24-051 (Order 87-24), filed 11/30/87. Statutory Authority: Chapter 49.17 RCW.
- 296-155-187 Appendix F—Work practices and engineering controls for major asbestos removal, renovation, and demolition operations—Nonmandatory. [Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-155-187, filed 4/27/87.] Repealed by 87-24-051 (Order 87-24), filed 11/30/87. Statutory Authority: Chapter 49.17 RCW.
- 296-155-189 Appendix G—Work practices and engineering controls for small-scale, short-duration asbestos renovation and maintenance operations—Nonmandatory. [Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-155-189, filed 4/27/87.] Repealed by 87-24-051 (Order 87-24), filed 11/30/87. Statutory Authority: Chapter 49.17 RCW.
- 296-155-191 Appendix H—Substance technical information for asbestos—Nonmandatory. [Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-155-191, filed 4/27/87.] Repealed by 87-24-051 (Order 87-24), filed 11/30/87. Statutory Authority: Chapter 49.17 RCW.
- 296-155-193 Appendix I—Medical surveillance guidelines for asbestos, tremolite, anthophyllite, and actinolite—Nonmandatory. [Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-155-193, filed 4/27/87.] Repealed by 87-24-051 (Order 87-24), filed 11/30/87. Statutory Authority: Chapter 49.17 RCW.
- 296-155-225 Safety belts, droplines, lifelines, and lanyards. [Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-225, filed 1/21/86; Order 76-29, § 296-155-225, filed 9/30/76; Order 74-26, § 296-155-225, filed 5/7/74, effective 6/6/74.] Repealed by 91-03-044 (Order 90-18), filed 1/10/91, effective 2/12/91. Statutory Authority: Chapter 49.17 RCW.

- 296-155-230 Safety nets. [Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-230, filed 1/21/86; Order 74-26, § 296-155-230, filed 5/7/74, effective 6/6/74.] Repealed by 91-03-044 (Order 90-18), filed 1/10/91, effective 2/12/91. Statutory Authority: Chapter 49.17 RCW.
- 296-155-425 Definitions applicable to this part. [Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-425, filed 1/21/86; Order 74-26, § 296-155-425, filed 5/7/74, effective 6/6/74.] Repealed by 88-11-021 (Order 88-04), filed 5/11/88. Statutory Authority: Chapter 49.17 RCW.
- 296-155-430 General requirements. [Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-430, filed 1/21/86; Order 77-20, § 296-155-430, filed 10/18/77; Order 77-12, § 296-155-430, filed 7/11/77; Order 74-26, § 296-155-430, filed 5/7/74, effective 6/6/74.] Repealed by 88-11-021 (Order 88-04), filed 5/11/88. Statutory Authority: Chapter 49.17 RCW.
- 296-155-435 Grounding and bonding. [Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-435, filed 1/21/86; Order 74-26, § 296-155-435, filed 5/7/74, effective 6/6/74.] Repealed by 88-11-021 (Order 88-04), filed 5/11/88. Statutory Authority: Chapter 49.17 RCW.
- 296-155-440 Equipment installation and maintenance. [Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-440, filed 1/21/86; Order 74-26, § 296-155-440, filed 5/7/74, effective 6/6/74.] Repealed by 88-11-021 (Order 88-04), filed 5/11/88. Statutory Authority: Chapter 49.17 RCW.
- 296-155-450 Battery rooms and battery charging. [Order 74-26, § 296-155-450, filed 5/7/74, effective 6/6/74.] Repealed by 88-11-021 (Order 88-04), filed 5/11/88. Statutory Authority: Chapter 49.17 RCW.
- 296-155-455 Hazardous locations. [Order 74-26, § 296-155-455, filed 5/7/74, effective 6/6/74.] Repealed by 88-11-021 (Order 88-04), filed 5/11/88. Statutory Authority: Chapter 49.17 RCW.
- 296-155-48501 Figure J-1. [Order 76-29, Figure J-1 (codified as WAC 296-155-48501), filed 9/30/76; Order 74-26, § 296-155-485 (part), Figure J-1, filed 5/7/74, effective 6/6/74.] Repealed by 82-08-026 (Order 82-10), filed 3/30/82. Statutory Authority: RCW 49.17.040 and 49.17.050.
- 296-155-48502 Figure J-2. [Order 76-29, Figure J-2 (codified as WAC 296-155-48502), filed 9/30/76; Order 74-26, § 296-155-485 (part), Figure J-2, filed 5/7/74, effective 6/6/74.] Repealed by 82-08-026 (Order 82-10), filed 3/30/82. Statutory Authority: RCW 49.17.040 and 49.17.050.
- 296-155-50501 Appendix—Roofs. [Statutory Authority: RCW 49.17.040, 49.17.050 and 49.17.240. 81-13-053 (Order 81-9), § 296-155-50501, filed 6/17/81.] Repealed by 91-03-044 (Order 90-18), filed 1/10/91, effective 2/12/91. Statutory Authority: Chapter 49.17 RCW.
- 296-155-580 Aerial lifts. [Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-580, filed 1/21/86; Order 74-26, § 296-155-580, filed 5/7/74, effective 6/6/74.] Repealed by 90-17-051 (Order 90-10), filed 8/13/90, effective 9/24/90. Statutory Authority: Chapter 49.17 RCW.
- 296-155-65505 Sewage piping system. [Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-65505, filed 1/21/86.] Repealed by 91-03-044 (Order 90-18), filed 1/10/91, effective 2/12/91. Statutory Authority: Chapter 49.17 RCW.
- 296-155-660 Specific excavation requirements. [Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-660, filed 1/21/86. Statutory Authority: RCW 49.17.040, 49.17.050 and 49.17.240. 81-13-053 (Order 81-9), § 296-155-660, filed 6/17/81; Order 76-29, § 296-155-660, filed 9/30/76; Order 74-26, § 296-155-660, filed 5/7/74, effective 6/6/74.] Repealed by 91-03-044 (Order 90-18), filed 1/10/91, effective 2/12/91. Statutory Authority: Chapter 49.17 RCW.
- 296-155-66005 Borrow pits. [Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-66005, filed 1/21/86.] Repealed by 91-03-044 (Order 90-18), filed 1/10/91, effective 2/12/91. Statutory Authority: Chapter 49.17 RCW.
- 296-155-665 Specific trenching requirements. [Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-665, filed 1/21/86; 85-10-004 (Order 85-09), § 296-155-665, filed 4/19/85. Statutory Authority: RCW 49.17.040, 49.17.050 and 49.17.240. 81-13-053 (Order 81-9), § 296-155-665, filed 6/17/81; Order 77-12, § 296-155-665, filed 7/11/77; Order 76-29, § 296-155-665, filed 9/30/76; Order 74-26, § 296-155-665, filed 5/7/74, effective 6/6/74.] Repealed by 91-03-044 (Order 90-18), filed 1/10/91, effective 2/12/91. Statutory Authority: Chapter 49.17 RCW.
- 296-155-66501 Table N-1. [Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-66501, filed 1/21/86; 82-13-045 (Order 82-22), § 296-155-66501, filed 6/11/82; Order 76-29, Table N-1 (codified as WAC 296-155-66501), filed 9/30/76; Order 74-26, § 296-155-665 (part), Table N-1, filed 5/7/74, effective 6/6/74.] Repealed by 91-03-044 (Order 90-18), filed 1/10/91, effective 2/12/91. Statutory Authority: Chapter 49.17 RCW.
- 296-155-66502 Table N-2. [Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-66502, filed 1/21/86; Order 76-29, Table N-2 (codified as WAC 296-155-66502), filed 9/30/76; Order 74-26, § 296-155-665 (part), Table N-2, filed 5/7/74, effective 6/6/74.] Repealed by 91-03-044 (Order 90-18), filed 1/10/91, effective 2/12/91. Statutory Authority: Chapter 49.17 RCW.
- 296-155-66503 Table N-3. [Order 76-29, Table N-3 (codified as WAC 296-155-66503), filed 9/30/76; Order 74-26, § 296-155-665 (part), Table N-3, filed 5/7/74, effective 6/6/74.] Repealed by 91-03-044 (Order 90-18), filed 1/10/91, effective 2/12/91. Statutory Authority: Chapter 49.17 RCW.
- 296-155-66504 Table N-4. [Order 76-29, Table N-4 (codified as WAC 296-155-66504), filed 9/30/76; Order 74-26, § 296-155-665 (part), Table N-4, filed 5/7/74, effective 6/6/74.] Repealed by 91-03-044 (Order 90-18), filed 1/10/91, effective 2/12/91. Statutory Authority: Chapter 49.17 RCW.
- 296-155-66505 Table N-5. [Statutory Authority: RCW 49.17.040, 49.17.050 and 49.17.240. 81-13-053 (Order 81-9), § 296-155-66505, filed 6/17/81; Order 76-29, Table N-5 (codified as WAC 296-155-66505), filed 9/30/76; Order 74-26, § 296-155-665 (part), Table N-5, filed 5/7/74, effective 6/6/74.] Repealed by 91-03-044 (Order 90-18), filed 1/10/91, effective 2/12/91. Statutory Authority: Chapter 49.17 RCW.
- 296-155-692 Requirements for lift-slab operations. [Statutory Authority: Chapter 49.17 RCW. 89-11-035 (Order 89-03), § 296-155-692, filed 5/15/89, effective 6/30/89.] Repealed by 90-03-029 (Order 89-20), filed 1/11/90, effective 2/26/90. Statutory Authority: Chapter 49.17 RCW.
- 296-155-750 Masonry construction. [Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-750, filed 1/21/86; Order 74-26, § 296-155-750, filed 5/7/74, effective 6/6/74.] Repealed by 89-11-035 (Order 89-03), filed 5/15/89, effective 6/30/89. Statutory Authority: Chapter 49.17 RCW.
- 296-155-760 Concrete finishing. [Order 74-26, § 296-155-760, filed 5/7/74, effective 6/6/74.] Repealed by 86-03-074 (Order 86-14), filed 1/21/86. Statutory Authority: RCW 49.17.040 and 49.17.050.
- 296-155-850 Definitions applicable to this part. [Order 74-26, § 296-155-850, filed 5/7/74, effective 6/6/74.] Repealed by 86-03-074 (Order 86-14), filed 1/21/86. Statutory Authority: RCW 49.17.040 and 49.17.050.
- 296-155-855 General provisions. [Order 74-26, § 296-155-855, filed 5/7/74, effective 6/6/74.] Repealed by 86-03-074 (Order 86-14), filed 1/21/86. Statutory Authority: RCW 49.17.040 and 49.17.050.
- 296-155-860 Blaster qualifications. [Order 74-26, § 296-155-860, filed 5/7/74, effective 6/6/74.] Repealed by 86-03-074 (Order

- 86-14), filed 1/21/86. Statutory Authority: RCW 49.17.040 and 49.17.050.
- 296-155-865 Surface transportation of explosives. [Order 74-26, § 296-155-865, filed 5/7/74, effective 6/6/74.] Repealed by 86-03-074 (Order 86-14), filed 1/21/86. Statutory Authority: RCW 49.17.040 and 49.17.050.
- 296-155-870 Underground transportation of explosives. [Order 74-26, § 296-155-870, filed 5/7/74, effective 6/6/74.] Repealed by 86-03-074 (Order 86-14), filed 1/21/86. Statutory Authority: RCW 49.17.040 and 49.17.050.
- 296-155-875 Storage of explosives and blasting agents. [Order 74-26, § 296-155-875, filed 5/7/74, effective 6/6/74.] Repealed by 86-03-074 (Order 86-14), filed 1/21/86. Statutory Authority: RCW 49.17.040 and 49.17.050.
- 296-155-880 Loading of explosives or blasting agents. [Order 74-26, § 296-155-880, filed 5/7/74, effective 6/6/74.] Repealed by 86-03-074 (Order 86-14), filed 1/21/86. Statutory Authority: RCW 49.17.040 and 49.17.050.
- 296-155-885 Initiation of explosive charges—Electric blasting. [Order 74-26, § 296-155-885, filed 5/7/74, effective 6/6/74.] Repealed by 86-03-074 (Order 86-14), filed 1/21/86. Statutory Authority: RCW 49.17.040 and 49.17.050.
- 296-155-890 Use of safety fuse. [Order 76-29, § 296-155-890, filed 9/30/76; Order 74-26, § 296-155-890, filed 5/7/74, effective 6/6/74.] Repealed by 86-03-074 (Order 86-14), filed 1/21/86. Statutory Authority: RCW 49.17.040 and 49.17.050.
- 296-155-895 Use of detonating cord. [Order 74-26, § 296-155-895, filed 5/7/74, effective 6/6/74.] Repealed by 86-03-074 (Order 86-14), filed 1/21/86. Statutory Authority: RCW 49.17.040 and 49.17.050.
- 296-155-900 Firing the blast. [Order 74-26, § 296-155-900, filed 5/7/74, effective 6/6/74.] Repealed by 86-03-074 (Order 86-14), filed 1/21/86. Statutory Authority: RCW 49.17.040 and 49.17.050.
- 296-155-905 Inspection after blasting. [Order 74-26, § 296-155-905, filed 5/7/74, effective 6/6/74.] Repealed by 86-03-074 (Order 86-14), filed 1/21/86. Statutory Authority: RCW 49.17.040 and 49.17.050.
- 296-155-910 Misfires. [Order 74-26, § 296-155-910, filed 5/7/74, effective 6/6/74.] Repealed by 86-03-074 (Order 86-14), filed 1/21/86. Statutory Authority: RCW 49.17.040 and 49.17.050.
- 296-155-915 Underwater blasting. [Order 74-26, § 296-155-915, filed 5/7/74, effective 6/6/74.] Repealed by 86-03-074 (Order 86-14), filed 1/21/86. Statutory Authority: RCW 49.17.040 and 49.17.050.
- 296-155-920 Blasting in excavation work under compressed air. [Order 74-26, § 296-155-920, filed 5/7/74, effective 6/6/74.] Repealed by 86-03-074 (Order 86-14), filed 1/21/86. Statutory Authority: RCW 49.17.040 and 49.17.050.

Reviser's note: Order 74-26, filed May 7, 1974, both repealed chapter 296-40 WAC, entitled "Safety Standards—Construction Work," and adopted this new chapter as a replacement. The effective date of this order is June 6, 1974.

**PART A
GENERAL SAFETY AND HEALTH PROVISIONS**

WAC 296-155-001 Foreword. (1) This chapter has been compiled with the purpose of consolidating safety and health construction safety standards into one chapter of the Washington Administrative Code, by the promulgation of the standards contained herein. It is also the intent that the safety standards of the Washington state department of labor and industries, will be at least as effective as those adopted by the U.S. Department of Labor and administered by the Occupational Safety and Health Administration as published in the Code of Federal Regulations. The department of labor and industries is incorporating many of the preexisting con-

struction safety standards and adding new standards under this chapter.

(2) Attention is called to the fact that certain Washington state standards contain standards and/or regulations applicable to all industries. These include, but are not limited to: The code for boilers and pressure vessels; the code for pressure piping; the general industrial safety and health standards; the general occupational health standards; regulations of the department of social and health services.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-001, filed 7/20/94, effective 9/20/94; Order 76-29, § 296-155-001, filed 9/30/76; Order 74-26, § 296-155-001, filed 5/7/74, effective 6/6/74.]

WAC 296-155-003 Subsections, subdivisions, items, subitems, and segments. (1) That portion of section numeration appearing after the chapter designation appears in either a three digit or a five digit format (e.g. WAC 296-24-330 and 296-24-30002). The final two digits of the section number are implied decimal extensions of the first three digits and represent a further division of the three digit enumeration.

(2) Sections of this chapter may be divided into subsections (1), (2), (3), etc., which may in turn be divided into subdivisions (a), (b), (c), etc., which may be further divided into items (i), (ii), (iii), etc., which may be further divided into subitems (A), (B), (C), etc., which may be further divided into segments (aa) [(I)], (bb) [(II)], (cc) [(III)], etc., all according to the following hierarchy, e.g.

Sections	296-24-330 and 296-24-33002
Subsections	(1) (2)
Subdivisions	(a) (b)
Items	(i) (ii)
Subitems	(A) (B)
Segments	I II

Note: "Part" as used in this standard means a major division of this chapter relating to a specific topic or topics and containing various related sections.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-003, filed 1/21/86; Order 74-26, § 296-155-003, filed 5/7/74, effective 6/6/74.]

WAC 296-155-005 Purpose and scope. (1) The standards included in this chapter apply throughout the state of Washington, to any and all work places subject to the Washington Industrial Safety and Health Act (chapter 49.17 RCW), where construction, alteration, demolition, related inspection, and/or maintenance and repair work, including painting and decorating, is performed. These standards are minimum safety requirements with which all industries must comply when engaged in the above listed types of work.

(2) If a provision of this chapter conflicts with a provision of the general safety and health standard (chapter 296-24 WAC) or the general occupational health standard

(chapter 296-62 WAC), the provision of this chapter shall prevail. When a provision of this chapter conflicts with a provision of another vertical safety standard applying to the place of work, the provisions of the vertical standard of specific application shall prevail.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-005, filed 1/21/86. Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 42.30 and 43.22 RCW. 80-17-014 (Order 80-20), § 296-155-005, filed 11/13/80; Order 76-29, § 296-155-005, filed 9/30/76; Order 74-26, § 296-155-005, filed 5/7/74, effective 6/6/74.]

WAC 296-155-006 Equipment approval by nonstate agency or organization. Whenever a provision of this chapter states that only that equipment or those processes approved by an agency or organization other than the department of labor and industries, such as the Underwriters Laboratories or the Mine Safety and Health Administration (MSHA) and the National Institute for Occupational Safety and Health (NIOSH), shall be utilized, that provision shall be construed to mean that approval of such equipment or process by the designated agency or group shall be prima facie evidence of compliance with the provisions of this chapter.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-006, filed 7/20/94, effective 9/20/94; Order 74-26, § 296-155-006, filed 5/7/74, effective 6/6/74.]

WAC 296-155-007 Incorporation of standards of national organization. Whenever a provision of this chapter incorporates by reference a national code or portion thereof which has been adopted by and is currently administered by another state agency, compliance with those provisions adopted and administered by such other state agency, if from a more recent edition of such national code, will be deemed to be prima facie evidence of compliance with the provisions of this chapter.

[Order 74-26, § 296-155-007, filed 5/7/74, effective 6/6/74.]

WAC 296-155-008 Incorporation of standards of federal agency. (1) Whenever a provision of this chapter incorporates therein provisions of the Code of Federal Regulations (CFR) and changes thereto, or any other regulations adopted by an agency of the federal government, that provision of this chapter shall be construed to mean that compliance with such regulations shall be prima facie evidence of compliance with the provisions of this chapter.

(2) Whenever a provision of this chapter incorporates therein provisions of the Code of Federal Regulations, the provisions so incorporated shall be those in effect on the date of effectiveness of this chapter, unless the content of the incorporating section specifies otherwise.

[Order 76-29, § 296-155-008, filed 9/30/76; Order 74-26, § 296-155-008, filed 5/7/74, effective 6/6/74.]

WAC 296-155-009 Equipment whether or not owned by, or under control of the employer. (1) It is the employer's responsibility to ensure that any defective equipment or tools are not used.

(2) When any tool or piece of equipment fails to meet the requirements of any safety standard or recognized safe practice, the tool or equipment shall not be used.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-009, filed 1/21/86.]

WAC 296-155-010 Variance and procedure. Realizing that conditions may exist in operations under which certain state standards will not have practical application, the director of the department of labor and industries or his/her authorized representative may, pursuant to this section, sections eight or nine of the Washington Industrial Safety and Health Act (chapter 80, Laws of 1973, RCW 49.17.080 and 49.17.090) and appropriate administrative rules of this state and the department of labor and industries and upon receipt of application and after adequate investigation by the department, permit a variation from these requirements when other means of providing an equivalent measure of protection are afforded. Such variation granted shall be limited to the particular case or cases covered in the application for variance and may be revoked for cause. The order granting a variance shall be conspicuously posted on the premises and shall remain posted during the time it is in effect. A copy of the variance shall be available at the work site. All requests for variances from safety and health standards included in this chapter, shall be made in writing to the director of the department of labor and industries at Olympia, Washington, or his/her duly authorized representative, Department of Labor and Industries, P.O. Box 44600, Olympia, Washington 98504-4600.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-010, filed 7/20/94, effective 9/20/94. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-010, filed 1/21/86; Order 74-26, § 296-155-010, filed 5/7/74, effective 6/6/74.]

WAC 296-155-012 Definitions applicable to all sections of this chapter.

Note: Unless the context indicates otherwise, words used in this chapter shall have the meaning given in this section. Certain parts of this chapter contain definitions as they apply to that particular part.

"Approved" means approved by the director of the department of labor and industries or his/her authorized representative: *Provided, however,* That should a provision of this chapter state that approval by an agency or organization other than the department of labor and industries is required, such as Underwriters' Laboratories or the bureau of mines, the provisions of WAC 296-155-006 shall apply.

"Assistant director" means the individual in charge of the division of consultation and compliance, department of labor and industries, or an authorized representative.

"Authorized person" means a person approved or assigned by the employer to perform a specific type of duty or duties or be at a specific location or locations at the workplace.

"Competent person" means one who is capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective action to eliminate them.

"Confined space" means a space that:

(1) Is large enough and so configured that an employee can bodily enter and perform assigned work; and

(2) Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry); and

(3) Is not designed for continuous employee occupancy.

"Construction work" shall mean and include all or any part of excavation, construction, erection, alteration, repair, demolition, and dismantling, of buildings and other structures and all operations in connection therewith; the excavation, construction, alteration and repair of sewers, trenches, caissons, conduits, pipe lines, roads and all operations pertaining thereto; the moving of buildings and other structures, and to the construction, alteration, repair, or removal of wharfs, docks, bridges, culverts, trestles, piers, abutments or any other construction, alteration, repair or removal work related thereto.

"Defect" means any characteristic or condition which tends to weaken or reduce the strength of the tool, object, or structure of which it is a part.

"Department" means the department of labor and industries.

"Designated person" means "authorized person" as defined in this section.

"Director" means the director of the department of labor and industries, or his/her designated representative.

"Division" means the division of consultation and compliance of the department.

"Employer" means any person, firm, corporation, partnership, business trust, legal representative, or other business entity which engages in any business, industry, profession, or activity in this state and employs one or more employees or who contracts with one or more persons, the essence of which is the personal labor of such person or persons and includes the state, counties, cities, and all municipal corporations, public corporations, political subdivisions of the state, and charitable organizations: *Provided*, that any person, partnership, or business entity not having employees, and who is covered by the industrial insurance act shall be considered both an employer and an employee.

"Equipment" means all machinery, devices, tools, facilities, safeguards, and protective construction used in connection with construction operations.

"Ground fault circuit interrupter" means a fast acting circuit breaker that is sensitive to very low levels of current leakage to ground. The device is designed to limit the electric shock to a current and time duration below that which can cause serious injury.

"Hazard" means that condition, potential or inherent, which is likely to cause injury, death, or occupational disease.

"Hazardous substance" means a substance which, by reason of being explosive, flammable, poisonous, corrosive, oxidizing, irritating, or otherwise harmful, is likely to cause death or injury.

"Maintenance" means the work of keeping a building, machine, roadway, etc., in a state of good repair.

"Part" means a major division, of this chapter, relating to a specific topic or topics and containing various sections, subsections, etc.

"Permit-required confined space (permit space)" means a confined space that has one or more of the following characteristics:

(1) Contains or has a potential to contain a hazardous atmosphere;

(2) Contains a material that has the potential for engulfing an entrant;

(3) Has an internal configuration such that an entrant could be trapped or asphyxiated by inwardly converging walls or by a floor which slopes downward and tapers to a smaller cross-section; or

(4) Contains any other recognized serious safety or health hazard.

"Qualified" means one who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training, and experience, has successfully demonstrated their ability to solve or resolve problems relating to the subject matter, the work, or the project.

"Repair" means to restore a building, machine, roadway, etc., to an original state after damage or decay.

"Safety factor" means the ratio of the ultimate breaking strength of a member or piece of material or equipment to the actual working stress or safe load when in use.

"Safety and health standard" means a standard which requires the adoption or use of one or more practices, means, methods, operations, or processes reasonably necessary or appropriate to provide safe or healthful employment and places of employment.

"Shall" means that the provision(s) of the standard are mandatory.

"Substantial" means constructed of such strength, of such material, and of such workmanship, that the object referred to will withstand all normal wear, shock and usage.

"Standard safeguard" means a device designed and constructed with the object of removing the hazard of accident incidental to the machine, appliance, tool, building, or equipment to which it is attached.

Standard safeguards shall be constructed of either metal or wood or other suitable material or a combination of these. The final determination of the sufficiency of any safeguard rests with the director of the department of labor and industries through the division of consultation and compliance.

"Suitable" means that which fits, or has the qualities or qualifications to meet a given purpose, occasion, condition, function, or circumstance.

"Working day" means a calendar day, except Saturdays, Sundays, and legal holidays as set forth in RCW 1.16.050, as now or hereafter amended, and for the purposes of the computation of time within which an act is to be done under the provisions of this chapter, shall be computed by excluding the first working day and including the last working day.

"Worker," "personnel," "man," "person," "employee," and other terms of like meaning, unless the context of the provision containing such term indicates otherwise, mean an employee of an employer who is employed in the business of their employer whether by way of manual labor or otherwise and every person in this state who is engaged in the employment of or who is working under an independent contract the essence of which is their personal labor for an employer whether by manual labor or otherwise.

"Work place" means any plant, yard, premises, room, or other place where an employee or employees are employed for the performance of labor or service over which the employer has the right of access or control, and includes, but is not limited to, all work places covered by industrial insurance under Title 51 RCW, as now or hereafter amended.

Abbreviations used in this chapter:

"ANSI" means American National Standards Institute.

"API" means American Petroleum Institute.

"ASA" means American Standards Association.

"ASAE" means American Society of Agricultural Engineers.

"ASHRE" means American Society of Heating and Refrigeration Engineers.

"ASME" means American Society of Mechanical Engineers.

"ASTM" means American Society of Testing and Materials.

"AWS" means American Welding Society.

"BTU" means British thermal unit.

"BTUH" means British thermal unit per hour.

"CFM" means cubic feet per minute.

"CFR" means Code of Federal Register.

"CGA" means Compressed Gas Association.

"CIE" means Commission Internationale de l'Eclairage.

"DOT" means department of transportation.

"FRP" means fiberglass reinforced plastic.

"GPM" means gallons per minute.

"ICC" means Interstate Commerce Commission.

"ID" means inside diameter.

"LPG" means liquefied petroleum gas.

"MCA" means Manufacturing Chemist Association.

"MSHA" means United States Department of Labor, Mine Safety and Health Administration.

"NBFU" means National Board of Fire Underwriters.

"NEMA" means National Electrical Manufacturing Association.

"NFPA" means National Fire Protection Association.

"NTP" means normal temperature and pressure.

"OD" means outside diameter.

"PSI" means pounds per square inch.

"PSIA" means pounds per square inch absolute.

"PSIG" means pounds per square inch gauge.

"RMA" means Rubber Manufacturers Association.

"SAE" means Society of Automotive Engineers.

"TFI" means The Fertilizer Institute.

"TSC" means Trailer Standard Code.

"UL" means Underwriters' Laboratories, Inc.

"USASI" means United States of America Standards Institute.

"USC" means United States Code.

"USCG" means United States Coast Guard.

"WAC" means Washington Administrative Code.

"WISHA" means Washington Industrial Safety and Health Act of 1973.

[Statutory Authority: Chapter 49.17 RCW. 95-04-007, § 296-155-012, filed 1/18/95, effective 3/1/95. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-012, filed 1/21/86; Order 74-26, § 296-155-012, filed 5/7/74, effective 6/6/74.]

WAC 296-155-015 Education and first-aid standards. It shall be the duty of every employer to comply with such standards and systems of education for safety as shall be, from time to time, prescribed for such employer by the director of labor and industries or by statute. Refer to WAC 296-155-100 through 296-155-135 for additional requirements.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-015, filed 7/20/94, effective 9/20/94; Order 74-26, § 296-155-015, filed 5/7/74, effective 6/6/74.]

WAC 296-155-020 Housekeeping. (1) All places of employment shall be kept clean to the extent that the nature of the work allows.

(2) To facilitate cleaning, every floor, working surface, and passageway shall be kept free from protruding nails, splinters, loose boards or openings.

(3) Cleaning and sweeping shall be performed in such a manner as to minimize the contamination of the air with dust.

(4) In areas where workers may pass or perform duties, all debris and accumulations of material shall be removed. Hoses and electrical conductors across aisles or passageways shall be covered or suspended overhead so that there is no tripping hazard.

(5) Where mechanical handling equipment is used, sufficient safe clearances shall be allowed for aisles, at loading docks, through doorways and wherever turns or passages must be made. Such aisles and passageways shall be marked.

(6) Storage of material shall not create a hazard. Bags, containers, bundles, construction materials and other equipment shall be stored in tiers, stacked, blocked or interlocked. They shall be limited in height so that they are stable and secure against falling, sliding, or collapse.

(7) Free access shall be maintained at all times to all exits, fire alarm boxes, fire extinguishing equipment, and any other emergency equipment. Free access means clear of all obstructions.

(8) Working and storage areas shall be kept free from accumulation of materials that pose hazards of tripping, fire, explosion, or pest harborage. Vegetation control shall be exercised.

(9) All lunchrooms, washrooms and restrooms shall be kept in a clean and sanitary condition. Garbage cans in lunchrooms and restrooms shall be equipped with fitted covers and the contents disposed of daily.

(10) During the course of construction, alteration, repair or demolition of buildings and structures, employers shall ensure continuous clean-up of their work area, including removal of all rubble, scrap, boxes, crates and excess material to trash disposal areas.

(11) Containers shall be provided for the collection and separation of waste, trash, oily or used rags, and other refuse. Containers used for garbage and other oily, flammable or hazardous wastes, such as caustics, acids, harmful dusts or similar materials shall be equipped with covers. Common garbage and other waste shall be disposed of at frequent and regular intervals. Chemical agents or substances which might react to create a hazardous condition shall be stored and disposed of separately. All hazardous wastes

which are subject to the requirements of chapter 173-303 WAC shall be handled, accumulated and disposed of in accordance with that chapter.

(12) All floors and walkways shall be maintained in good condition. Loose or broken components shall be repaired or replaced. Secure footing shall be ensured on all floors and walkways.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-020, filed 1/21/86; Order 74-26, § 296-155-020, filed 5/7/74, effective 6/6/74.]

WAC 296-155-030 Acceptable certifications. (1) Pressure vessels. Current and valid certification by an insurance company or regulatory authority shall be deemed as acceptable evidence of safe installation, inspection, testing of pressure vessels provided by the employer.

(2) Boilers. Boilers provided by the employer shall be deemed to be in compliance with the requirements of this section when evidence of current and valid certification by an insurance company or regulatory authority attesting to the safe installation, inspection, and testing is presented.

(3) Other requirements. Regulations prescribing specific requirements for other types of pressure vessels and similar equipment are contained in Parts D and M of this chapter.

[Order 74-26, § 296-155-030, filed 5/7/74, effective 6/6/74.]

WAC 296-155-035 General requirements. (1) The use of any machinery, tool, material, or equipment which is not in compliance with any applicable requirements of this chapter is prohibited. Such machine, tool, material, or equipment shall either be identified as unsafe by tagging or locking the controls to render them inoperable or shall be physically removed from its place of operation.

(2) The employer shall permit only those employees qualified by training or experience to operate equipment and machinery.

(3) Employees shall use safeguards provided for their protection.

(4) Suitable clothing shall be worn for the job. Sufficient and proper clothing shall be worn to assist in preventing scratches, abrasions, slivers, sunburn, hot liquid burns, or similar hazards. Loose or ragged clothing, scarfs or ties shall not be worn while working around moving machinery.

(5) Where work is in progress above workers, a catch platform or other means shall be provided to protect those working below. All workers shall be notified. One completed floor shall be maintained between workers and steel or concrete work above.

(6) Employees shall report to their employers the existence of any unsafe equipment or method or any other hazard which, to their knowledge is unsafe and where such unsafe equipment or method or other hazard exists in violation of this chapter it shall be corrected.

(7) Nothing herein contained shall prevent the use of existing equipment during its lifetime provided it shall be properly safeguarded, maintained in good condition, be in conformity with applicable safety and health standards, and shall conform to safety factors for the material used, as herein provided.

(8) As construction progresses, the component parts of structures shall be secured or braced to prevent collapse or failure.

(9) Prompt and safe removal of injured employees from elevated work locations, trenches and excavations shall be ensured prior to commencement of work.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-035, filed 1/21/86; Order 74-26, § 296-155-035, filed 5/7/74, effective 6/6/74.]

WAC 296-155-040 Safe place standards. (1) Each employer shall furnish to each employee a place of employment free from recognized hazards that are causing or likely to cause serious injury or death to employees.

(2) Every employer shall require safety devices, furnish safeguards, and shall adopt and use practices, methods, operations, and processes which are reasonably adequate to render such employment and place of employment safe. Every employer shall do everything reasonably necessary to protect the life and safety of employees.

(3) No employer shall require any employee to go or be in any employment or place of employment which is hazardous to the employee.

(4) No employer shall fail or neglect:

(a) To provide and use safety devices and safeguards.

(b) To adopt and use methods and processes reasonably adequate to render the employment and place of employment safe.

(c) To do everything reasonably necessary to protect the life and safety of employees.

(5) No employer, owner, or lessee of any real property shall construct or cause to be constructed any place of employment that is hazardous to the employee.

(6) No person shall do any of the following:

(a) Remove, displace, damage, destroy or carry off any safety device, safeguard, notice, or warning, furnished for use in any employment or place of employment.

(b) Interfere in any way with the use thereof by any other person.

(c) Interfere with the use of any method or process adopted for the protection of any employee, including themselves, in such employment, or place of employment.

(d) Fail or neglect to do everything reasonably necessary to protect the life and safety of employees.

(7) The use of intoxicants or debilitating drugs while on duty is prohibited. Employees under the influence of intoxicants or drugs shall not be permitted in or around worksites. This subsection (7) shall not apply to employees taking prescription drugs or narcotics as directed and prescribed by a physician, provided such use does not endanger the employee or others.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-040, filed 7/20/94, effective 9/20/94; Order 74-26, § 296-155-040, filed 5/7/74, effective 6/6/74.]

PART B-1 OCCUPATIONAL HEALTH AND ENVIRONMENTAL CONTROL

WAC 296-155-100 Management's responsibility.

(1) It shall be the responsibility of management to establish,

supervise, and enforce, in a manner which is effective in practice:

- (a) A safe and healthful working environment.
- (b) An accident prevention program as required by these standards.
- (c) Training programs to improve the skill and competency of all employees in the field of occupational safety and health.

(2) Employees required to handle or use poisons, caustics, and other harmful substances shall be instructed regarding the safe handling and use, and be made aware of the potential hazards, personal hygiene, and personal protective measures required.

(3) In job site areas where harmful plants or animals are present, employees who may be exposed shall be instructed regarding the potential hazards, and how to avoid injury, and the first aid procedures to be used in the event of injury.

(4) Employees required to handle or use flammable liquids, gases, or toxic materials shall be instructed in the safe handling and use of these materials and made aware of the specific requirements contained in Parts B, D, and other applicable parts of this standard.

(5) Permit-required confined spaces. The requirements of chapters 296-24, 296-62 and 296-155 WAC apply.

(6) The employer shall ensure that work assignments place no employee in a position or location not within ordinary calling distance of another employee able to render assistance in case of emergency.

Note: This subsection does not apply to operators of motor vehicles, watchpersons or other jobs which, by their nature, are single employee assignments. However, a definite procedure for checking the welfare of all employees during working hours should be instituted and all employees so advised.

(7) Each employer shall post and keep posted a notice or notices (Job Safety and Health Protection - Form F416-081-000) to be furnished by the department of labor and industries, informing employees of the protections and obligations provided for in the act and that for assistance and information, including copies of the act, and of specific safety and health standards employees should contact the employer or the nearest office of the department of labor and industries. Such notice or notices shall be posted by the employer at each establishment in a conspicuous place or places where notices to employees are customarily posted. Each employer shall take steps to assure that such notices are not altered, defaced, or covered by other material.

[Statutory Authority: Chapter 49.17 RCW. 95-04-007, § 296-155-100, filed 1/18/95, effective 3/1/95; 94-15-096 (Order 94-07), § 296-155-100, filed 7/20/94, effective 9/20/94; 91-24-017 (Order 91-07), § 296-155-100, filed 11/22/91, effective 12/24/91. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-100, filed 1/21/86; Order 76-6, § 296-155-100, filed 3/1/76; Order 74-26, § 296-155-100, filed 5/7/74, effective 6/6/74.]

WAC 296-155-105 Employee's responsibility. (1) Employees shall coordinate and cooperate with all other employees in an attempt to eliminate accidents.

(2) Employees shall study and observe all safety standards governing their work.

(3) Employees shall apply the principles of accident prevention in their daily work and shall use proper safety

devices and protective equipment as required by their employment or employer.

(4) Employees shall properly care for all personal protective equipment.

(5) Employees shall make a report, on the day of the incident, to their immediate supervisor, of each industrial injury or occupational illness, regardless of the degree of severity.

[Order 74-26, § 296-155-105, filed 5/7/74, effective 6/6/74.]

WAC 296-155-110 Accident prevention program.

(1) Exemptions. Workers of employers whose primary business is other than construction, who are engaged solely in maintenance and repair work, including painting and decorating, are exempt from the requirement of this section provided:

(a) The maintenance and repair work, including painting and decorating, is being performed on the employer's premises, or facility.

(b) The length of the project does not exceed one week.

(c) The employer is in compliance with the requirements of WAC 296-24-040 Accident prevention programs, and WAC 296-24-045, Safety and health committee plan.

(2) Each employer shall develop a formal accident-prevention program, tailored to the needs of the particular plant or operation and to the type of hazard involved. The department may be contacted for assistance in developing appropriate programs.

(3) The following are the minimal program elements for all employers:

A safety orientation program describing the employer's safety program and including:

(a) How, where, and when to report injuries, including instruction as to the location of first-aid facilities.

(b) How to report unsafe conditions and practices.

(c) The use and care of required personal protective equipment.

(d) The proper actions to take in event of emergencies including the routes of exiting from areas during emergencies.

(e) Identification of the hazardous gases, chemicals, or materials involved along with the instructions on the safe use and emergency action following accidental exposure.

(f) A description of the employer's total safety program.

(g) An on-the-job review of the practices necessary to perform job assignments in a safe manner.

(4) Each accident-prevention program shall be outlined in written format.

(5) Every employer shall conduct crew leader-crew safety meetings as follows:

(a) Crew leader-crew safety meetings shall be held at the beginning of each job, and at least weekly thereafter.

(b) Crew leader-crew meetings shall be tailored to the particular operation.

(6) Crew leader-crew safety meetings shall address the following:

(a) A review of any walk-around safety inspection conducted since the last safety meeting.

(b) A review of any citation to assist in correction of hazards.

(c) An evaluation of any accident investigations conducted since the last meeting to determine if the cause of the unsafe acts or unsafe conditions involved were properly identified and corrected.

(d) Attendance shall be documented.

(e) Subjects discussed shall be documented.

Note: Subcontractors and their employees may, with the permission of the general contractor, elect to fulfill the requirements of subsection (5)(a) and (b) of this section by attending the prime contractors crew leader-crew safety meeting. Any of the requirements of subsections (6)(a), (b), (c), and (7) of this section not satisfied by the prime contractors safety meetings shall be the responsibility of the individual employers.

(7) Minutes of each crew leader-crew meeting shall be prepared and a copy shall be maintained at the location where the majority of the employees of each construction site report for work each day.

(8) Minutes of crew leader-crew safety meetings shall be retained by the employer for at least one year and shall be made available for review by personnel of the department, upon request.

(9) Every employer shall conduct walk-around safety inspections as follows:

(a) At the beginning of each job, and at least weekly thereafter, a walk-around safety inspection shall be conducted jointly by one member of management and one employee, elected by the employees, as their authorized representative.

(b) The employer shall document walk-around safety inspections and such documentation shall be available for inspection by personnel of the department.

(c) Records of walk-around inspections shall be maintained by the employer until the completion of the job.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-110, filed 7/20/94, effective 9/20/94; 92-09-148 (Order 92-01), § 296-155-110, filed 4/22/92, effective 5/25/92. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-110, filed 1/21/86; Order 74-26, § 296-155-110, filed 5/7/74, effective 6/6/74.]

WAC 296-155-115 Safety bulletin board. There shall be installed and maintained in every fixed establishment (the place where employees regularly report to work) employing eight or more persons, a safety bulletin board sufficient in size to display and post safety bulletins, newsletters, posters, accident statistics and other safety educational material.

[Order 74-26, § 296-155-115, filed 5/7/74, effective 6/6/74.]

WAC 296-155-120 First-aid training and certification. This section is designed to assure that all employees in this state are afforded quick and effective first-aid attention in the event of an on the job injury. To achieve this purpose the presence of personnel trained in first-aid procedures at or near those places where employees are working is required. Compliance with the provisions of this section may require the presence of more than one first-aid trained person.

(1) Each employer shall have available at all worksites, at all times, a person or persons holding a valid certificate of first-aid training from the department of labor and industries or other organization, association or agency that has been approved by the department.

(a) A valid first-aid certificate is one which is less than three years old.

(b) All crew leaders, supervisors or persons in direct charge of crews shall have a valid first-aid certificate.

(c) For the purposes of this section, a crew shall mean a group of two or more employees working at any worksite.

Note: In emergencies, crew leaders will be permitted to work up to thirty days without having the required certificate, providing an employee in the crew or another crew leaders in the immediate work area has the necessary certificate.

(2) Valid certification shall be achieved by passing a course of first-aid instruction and participation in practical application of the following subject matter:

Bleeding control and bandaging.

Cardio-pulmonary resuscitation "C.P.R."

Poisons.

Shock, unconsciousness, stroke.

Burns, scalds.

Sunstroke, heat exhaustion.

Frostbite, freezing, hypothermia.

Strains, sprains, hernias.

Fractures, dislocation.

Proper transportation of the injured.

Bites, stings.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-120, filed 7/20/94, effective 9/20/94. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-120, filed 1/21/86; Order 74-26, § 296-155-120, filed 5/7/74, effective 6/6/74.]

WAC 296-155-125 First-aid kit. (1) All employers who employ men and women covered by the act shall furnish first-aid kits as required by the department of labor and industries, (RCW 51.36.030).

(2) First-aid supplies shall be readily accessible when required by this section.

(3) In the absence of readily accessible first-aid supplies such as first-aid kits, first-aid stations, first-aid rooms or their equivalent, all crew trucks, power shovels, cranes, locomotives, loaders, dozers, logging trucks, speeders, freight trucks and similar equipment shall be equipped with not less than a ten package weather-proof first-aid kit.

(4) All crew vehicles used for transporting workers shall be equipped with not less than a ten package weather-proof first-aid kit. When more than five employees are being transported on any one trip, the kit shall be increased in size to comply with a 16-, 24-, or 36-package kit depending upon the number of personnel normally being transported.

(5) At least one weather-proof first-aid kit shall be available on construction jobs, line crews, and other transient or short duration jobs.

(6) The size and quantity of first-aid kits, required to be located at any site, shall be determined by the number of personnel normally dependent upon each kit as outlined in the following table:

Number of Personnel Normally Assigned To Worksite	Minimum First Aid Supplies Required At Worksite
1 - 50 persons	First-aid kit
1 - 5	10 package kit
6 - 15	16 package kit
16 - 30	24 package kit
31 - 50	36 package kit
51 - 200	First-aid station
51 - 75	One 36 and one 10 package kit
76 - 100	One 36 and one 16 package kit
101 - 150	One 36 and one 24 package kit
151 - 200	Two 36 package kits
Over 200 persons	First-aid room
	Refer to WAC 296-24-070

(7) Employers shall establish a procedure to ensure that first-aid kits and required contents are maintained in a serviceable condition.

(8) First-aid kits shall contain at least the following items, in a weatherproof container with individual sealed packages for each type of item:

10 package kit

- 1 Pkg. adhesive bandages, 1" (16 per pkg.)
- 1 Pkg. bandage compress, 4" (1 per pkg.)
- 1 Pkg. scissors* and tweezers (1 each per pkg.)
- 1 Pkg. triangular bandage, 40" (1 per pkg.)
- 1 Pkg. antiseptic soap or pads (3 per pkg.)
- 5 Pkgs. of consulting physician's choice**

16 package kit

- 1 Pkg. absorbent gauze, 24" x 72" (1 per pkg.)
- 1 Pkg. adhesive bandages, 1" (16 per pkg.)
- 2 Pkgs. bandage compresses, 4" (1 per pkg.)
- 1 Pkg. eye dressing (1 per pkg.)
- 1 Pkg. scissors* and tweezers (1 each per pkg.)
- 2 Pkgs. triangular bandages, 40" (1 per pkg.)
- 1 Pkg. antiseptic soap or pads (3 per pkg.)
- 7 Pkgs. of consulting physician's choice**

24 package kit

- 2 Pkgs. absorbent gauze, 24" x 72" (1 per pkg.)
- 2 Pkgs. adhesive bandages, 1" (16 per pkg.)
- 2 Pkgs. bandage compresses, 4" (1 per pkg.)
- 1 Pkg. eye dressing (1 per pkg.)
- 1 Pkg. scissors* and tweezers (1 each per pkg.)
- 6 Pkgs. triangular bandages, 40" (1 per pkg.)
- 1 Pkg. antiseptic soap or pads (3 per pkg.)
- 9 Pkgs. of consulting physician's choice**

36 package kit

- 4 Pkgs. absorbent gauze, 24" x 72" (1 per pkg.)

- 2 Pkgs. adhesive bandages, 1" (16 per pkg.)
- 5 Pkgs. bandage compresses, 4" (1 per pkg.)
- 2 Pkgs. eye dressing (1 per pkg.)
- 1 Pkg. scissors* and tweezers (1 each per pkg.)
- 8 Pkgs. triangular bandages, 40" (1 per pkg.)
- 1 Pkg. antiseptic soap or pads (3 per pkg.)
- 13 Pkgs. of consulting physicians choice**

*Scissors shall be capable of cutting 2 layers of 15 oz. cotton cloth or its equivalent.

**First-aid kits shall be maintained at the ten, sixteen, twenty-four or thirty-six package level. In the event the consulting physician chooses not to recommend items, the department shall be contacted for recommended items to complete the kit.

(9) When practical, a poster shall be fastened and maintained either on or in the cover of each first-aid kit and at or near all phones plainly stating worksite address or location, the phone numbers of available doctors, hospitals, and ambulance services within the district of the worksite.

Note: Preprinted Form No. FSPO 900-001-1 is available from all department offices. First-aid kit Form No. FSPI -005-000 is also available.

(10) Where the eyes or body of any person may be exposed to injurious chemicals and/or materials, suitable facilities for quick drenching or flushing of the eyes and body shall be provided, within the work area, for immediate emergency use.

(11) When required by the department, two wool blankets or two fire retardant blankets, capable of supporting 250 pounds each, and a stretcher shall be available in addition to first-aid kits.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-125, filed 7/20/94, effective 9/20/94. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-125, filed 1/21/86; Order 74-26, § 296-155-125, filed 5/7/74, effective 6/6/74.]

WAC 296-155-130 First-aid station. (1) First-aid stations shall be well marked and located as close as practical to the highest concentration of employees.

(2) One person holding a valid first-aid certificate shall be responsible for the proper use and maintenance of the first-aid station.

(3) First-aid stations shall be equipped with a minimum of two first-aid kits, the size of which shall be dependent upon the number of personnel normally employed at the worksite. One first-aid kit may be a permanent wall-mounted kit, but in all cases the station shall be equipped with at least one portable first-aid kit.

(4) The first-aid station shall be equipped with two wool blankets, or two fire retardant blankets capable of supporting 250 pounds each, and a stretcher in addition to first-aid kits.

(5) A roster, denoting the telephone numbers and addresses of doctors, hospitals and ambulance services available to the worksite, shall be posted at each first-aid station.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-130, filed 1/21/86; Order 74-26, § 296-155-130, filed 5/7/74, effective 6/6/74.]

WAC 296-155-135 First-aid room. Refer to the general safety and health standards, WAC 296-24-070.

[Order 74-26, § 296-155-135, filed 5/7/74, effective 6/6/74.]

WAC 296-155-140 Sanitation. (1) Potable water.

(a) An adequate supply of potable water shall be provided in all places of employment.

(b) Portable containers used to dispense drinking water shall be capable of being tightly closed and equipped with a tap. Water shall not be dipped from containers.

(c) Any container used to distribute drinking water shall be clearly marked as to the nature of its contents and not used for any other purpose.

(d) The common drinking cup is prohibited.

(e) Where single service cups (to be used but once) are supplied, both a sanitary container for the unused cups and a receptacle for disposing of the used cups shall be provided.

(f) All water containers used to furnish drinking water shall be thoroughly cleaned at least once each week or more often as conditions require.

(g) The requirements of this subsection do not apply to mobile crews or to normally unattended work locations as long as employees working at these locations have transportation immediately available, within the normal course of their duties, to nearby facilities otherwise meeting the requirements of this section.

(h) The following definitions apply:

(i) Mobile crew: A work crew that routinely moves to a different work location periodically. Normally a mobile crew is not at the same location all day.

(ii) Normally unattended work location: An unattended site that is visited occasionally by one or more employees.

(iii) Nearby facility: A sanitary facility that is within three minutes travel by the transportation provided.

(iv) "Potable water" means water which meets the quality standards for drinking purposes of state or local authority having jurisdiction or water that meets the quality standards prescribed by the United States Environmental Protection Agency's National Interim Primary Drinking Water Regulations, published in 40 CFR Part 141, and 40 CFR 147.2400.

(2) Wash water.

(a) Clean, tepid wash water, between 70 and 100 degrees Fahrenheit, shall be provided at all construction sites.

(b) Individual hand towels shall be provided. Both a sanitary container for the unused towels and a receptacle for disposal of used towels shall be provided.

(c) Hand soap, industrial hand cleaner or similar cleansing agents shall be provided. Cleansing agents shall be adequate to remove any paints, coatings, herbicides, insecticides or other contaminants.

(d) The requirements of this subsection do not apply to mobile crews or to normally unattended work locations as long as employees working at these locations have transportation immediately available, within the normal course of their duties, to nearby facilities otherwise meeting the requirements of this section.

(e) Gasoline or solvents shall not be used for personal cleaning.

(f) Wash water areas will be maintained in a dry condition. Slipping or other hazards shall be eliminated from the wash water area before it is acceptable for use.

(3) Nonpotable water.

(a) Outlets for nonpotable water, such as water for industrial or fire fighting purposes only, shall be identified

by signs meeting the requirements of Part E of this chapter, to indicate clearly that the water is unsafe and is not to be used for drinking, washing or cooking purposes.

(b) There shall be no cross-connection, open or potential, between a system furnishing potable water, a system furnishing nonpotable water or a system furnishing wash water.

(4) Toilets.

(a) The provisions of this section apply to both portable chemical toilets and to flush toilets, except where flush toilets are used the requirements of WAC 296-24-12007 (1)(a) shall apply instead of (b) of this subsection.

(b) Accessible toilets shall be provided for employees according to the following table:

TABLE B-1

<u>Number of Employees</u>	<u>Toilets Required</u>
1 - 10	1
11 - 25	2
26 - 40	3
41 - 60	4
61 - 80	5
Over 80	one additional toilet for each additional twenty employees or any fraction thereof.

(c) When the employer provides both flush and portable chemical toilets, the number of employees allowed to be served by the flush toilets, per WAC 296-24-12007 (1)(a) will be calculated. That number will be subtracted from the total number of employees and the employer will be required to provide an adequate number of portable chemical toilets for the number of remaining employees, as required by (b) of this subsection.

(d) Toilets shall be maintained in clean, sanitary and functional condition. Internal latches shall be provided to secure the units from inadvertent entry. Where there are twenty or more employees consisting of both sexes, facilities shall be provided for each sex.

(i) Each unit shall be properly cleaned on a routine basis.

(ii) Chemicals, toilet tissue and sanitary seat covers shall be maintained in a supply sufficient for use during the entire shift.

(iii) Any defective or inadequate unit shall be immediately removed from service.

(e) Specifications. The following specifications apply:

(i) A noncaustic chemical toilet (portable chemical toilet is) a self-contained unit equipped with a waste receiving chemical holding container.

(ii) Portable chemical toilets consisting of only a holding tank, commonly referred to as "elevator units" or "elevator toilets" are not acceptable. "Elevator units" may be used if they are individually located in a lockable room which affords privacy. When this type unit is used in a private individual lockable room the entire room will be considered a toilet facility, as such the room will meet all requirements of toilet facilities and be inspected in accordance with subsection (5)(b)(iii) of this section.

(iii) Rooms, buildings or shelters housing toilets shall be of sound construction, easy to clean, provide shelter and provide privacy. The toilet rooms shall be ventilated to the outside and adequately lighted. All openings into the toilet room shall be covered with 16-mesh screen.

(iv) Toilets shall be serviced on a regular schedule. Servicing shall include the use of a disinfectant for cleaning urinals and seats, removing waste from containers, recharging containers with an odor controlling chemical and installing an adequate supply of toilet tissue and seat covers.

(v) Service shall be performed in accordance with local codes by approved servicing organizations. Waste shall be disposed of or discharged in accordance with requirements of local health department regulations.

(vi) Waste containers shall be fabricated from impervious materials, e.g. plastic, steel, fiberglass or their equivalent. Containers shall be water tight and capable of containing the chemical waste in a sanitary manner. The container shall be fitted to the building in a manner so as to prevent insects from entering from the exterior of the building. Containers shall be adequate in size to be used by the number of persons, according to the schedule for minimum requirements, without filling the container to more than half of its volume before regularly scheduled servicing.

(vii) Removal of waste shall be handled in a clean and sanitary manner by means of a vacuum hose and received by a leak-proof tank truck. All valves on the tank shall be leak-proof.

(viii) Provisions shall be made so service trucks have a clear approach and convenient access to the toilets to be serviced.

(ix) Disposal of waste from tank trucks shall be in accordance with local health department requirements. In the absence of provisions by local health departments, waste must be disposed of through municipal or district sanitary sewage systems. Municipal or area sanitary sewage districts shall provide sewage disposal locations and facilities which are adequate and convenient for duly authorized toilet service organizations.

(f) The requirements of this subsection do not apply to mobile crews or to normally unattended work locations as long as employees working at these locations have transportation immediately available, within the normal course of their duties, to nearby facilities otherwise meeting the requirements of this section.

(5)(a) On multi-employer worksites, the prime contractor shall ensure that the requirements of this section are met. Each employer is responsible for seeing that facilities for their own employees are provided.

(b) Each employer shall ensure, at the beginning of each shift, that the sanitation facilities required by this section are inspected. If any facility or unit fails to meet the following requirements, immediate corrective action shall be taken. Such action shall be documented and maintained at the site for at least 72 hours. Inspection shall establish:

(i) Potable water: Sufficient supply of water, sufficient supply of cups, container integrity, cleanliness of unit and area, capacity of trash receptacle (empty).

(ii) Wash water: Sufficient supply of clean water, proper temperature, sufficient supply of towels, sufficient supply of cleansing agents, container integrity, cleanliness of

unit and area without the presence of physical hazards, capacity of trash receptacle (empty).

(ii) Toilets: Sufficient supply of toilet tissue and sanitary seat covers, capacity and condition of chemical agent, capacity and condition of holding tank, cleanliness of unit and area without the presence of physical hazards, physical and structural condition of unit, condition of lock, condition of toilet seat and tissue holder, absence of all foreign debris.

(c) The location of the facilities required by subsections (1), (2) and (4) of this section shall be as close as practical to the highest concentration of employees.

(i) On multistory structures they shall be furnished on every third floor.

(ii) At all sites they shall be located within 200 feet horizontal of all employees.

(iii) The requirements of subsection (5)(c)(i) and (ii) do not apply to mobile crews or to normally unattended work locations as long as employees working at these locations have transportation immediately available, within the normal course of their duties, to nearby facilities otherwise meeting the requirements of this section.

(6) Food handling. All employees' food service facilities and operations shall meet the applicable laws, ordinances and regulations of the jurisdictions in which they are located.

(7) Temporary sleeping quarters. When temporary sleeping quarters are provided, they shall be heated, ventilated and lighted.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-140, filed 7/20/94, effective 9/20/94; 89-11-035 (Order 89-03), § 296-155-140, filed 5/15/89, effective 6/30/89. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-140, filed 1/21/86; Order 74-26, § 296-155-140, filed 5/7/74, effective 6/6/74.]

WAC 296-155-145 Occupational noise exposure.

The occupational noise exposure requirements of the general occupational health standards, chapter 296-62 WAC, shall apply.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 85-01-022 (Order 84-24), § 296-155-145, filed 12/11/84; 83-15-017 (Order 83-19), § 296-155-145, filed 7/13/83, effective 9/12/83; Order 76-29, § 296-155-145, filed 9/30/76; Order 74-26, § 296-155-145, filed 5/7/74, effective 6/6/74.]

WAC 296-155-150 Ionizing radiation.

(1) In construction and related activities involving the use of sources of ionizing radiation, the pertinent provisions of the Nuclear Regulatory Commission's Standards for Protection Against Radiation, relating to protection against occupational radiation exposure, shall apply.

(2) Any activity which involves the use of radioactive material or x-ray, whether or not under license from the Nuclear Regulatory Commission, shall be performed by competent persons specially trained in the proper and safe operation of such equipment. In the case of materials used under commission license, only persons actually licensed, or competent persons under direction and supervision of the licensee shall perform such work.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-150, filed 7/20/94, effective 9/20/94; Order 74-26, § 296-155-150, filed 5/7/74, effective 6/6/74.]

WAC 296-155-155 Nonionizing radiation. (1) Only qualified and trained employees shall be assigned to install, adjust, and operate laser equipment.

(2) Proof of qualification of the laser equipment operator shall be available and in possession of operator at all times.

(3) Employees, when working in areas in which a potentially hazardous exposure (see WAC 296-62-09005(4)) to direct or reflected laser radiation exists, shall be provided with antilaser eye protection devices specified in Part C of this chapter.

(4) Areas in which Class II and III lasers are used shall be posted with standard laser warning placards.

(5) Beam shutters or caps shall be utilized, or the laser turned off, when laser transmission is not actually required. When the laser is left unattended for a substantial period of time, such as during lunch hour, overnight, or at change of shifts, the laser shall be turned off.

(6) Only mechanical or electronic means shall be used as a detector for guiding the internal alignment of the laser.

(7) The laser beam shall not be directed at employees.

(8) When it is raining or snowing, or when there is dust or fog in the air, and it is impracticable to cease laser system operation, employees shall be kept out of range of the area of source and target during such weather conditions.

(9) Laser equipment shall bear a conspicuously displayed label to indicate hazard classification. This label shall be prepared in accordance with 21 CFR 1040.10.

(10) Only Class I, II, or III laser equipment shall be used. Class IV laser equipment shall not be used.

(11) Laser unit in operation shall be set up above the heads of the employees, when possible.

(12) Employees shall not be exposed to radiofrequency/microwave radiation in excess of the permissible exposure limits specified in WAC 296-62-09005.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-155, filed 1/21/86; 85-01-022 (Order 84-24), § 296-155-155, filed 12/11/84; Order 74-26, § 296-155-155, filed 5/7/74, effective 6/6/74.]

WAC 296-155-160 Gases, vapors, fumes, dusts, and mists. (1) Exposure of employees to inhalation, ingestion, skin absorption, or contact with any material or substance at a concentration above those specified in the general occupational health standards, WAC 296-62-07515 shall be avoided.

(2) To achieve compliance with subsection (1) of this section, administrative or engineering controls must first be implemented whenever feasible. When such controls are not feasible to achieve full compliance, protective equipment or other protective measures shall be used to keep the exposure of employees to air contaminants within the limits prescribed in WAC 296-62-07515. Any equipment and technical measures used for this purpose must first be approved for each particular use by a competent industrial hygienist or other technically qualified person. Whenever respirators are used, their use shall comply with WAC 296-155-220.

(3) Whenever internal combustion equipment exhausts in enclosed spaces, tests shall be made and recorded to ensure that employees are not exposed to unsafe concentrations of toxic gases or oxygen deficient atmospheres. See

chapter 296-62 WAC, the general occupational health standards.

(4) Whenever any employee is exposed to asbestos, the provisions of the general occupational health standards, chapter 296-62 WAC shall apply.

(5) Subsections (1) and (2) of this section do not apply to the exposure of employees to formaldehyde. Whenever any employee is exposed to formaldehyde, the requirements of WAC 296-62-07540 shall apply.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-160, filed 7/20/94, effective 9/20/94; 88-14-108 (Order 88-11), § 296-155-160, filed 7/6/88; 87-24-051 (Order 87-24), § 296-155-160, filed 11/30/87. Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-155-160, filed 4/27/87. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-160, filed 1/21/86. Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-155-160, filed 11/30/83; Order 74-26, § 296-155-160, filed 5/7/74, effective 6/6/74.]

WAC 296-155-165 Lighting and illumination. (1) Lighting which is adjusted to provide a margin of safety in production and inspection tasks shall be provided and maintained. The minimum level of task lighting in all indoor work places shall be an average of ten foot-candles measured thirty inches above the floor. MSHA approved cap lights are acceptable for use in tunnel headings.

(2) Whenever general lighting of an entire area is not provided, illumination sufficient to provide visibility of potentially hazardous objects and emergency control equipment shall be supplied. The minimum level of nontask lighting in all indoor work places shall be an average of three foot-candles measured thirty inches above the floor.

(3) Diffusion and distribution of artificial and natural light. Artificial light sources shall be installed with regard to mounting height, spacing and reflectors or other suitable accessories so as to secure a reasonably uniform distribution of illumination and to avoid glare and sharply defined shadows which could temporarily reduce a person's ability to see clearly.

Note: This section establishes minimal levels of illumination for safety purposes only. Guidelines pertaining to optimal levels of lighting and illumination may be found in Practice for Industrial Lighting ANSI/IES RP7-1979.

(4) The minimum levels specified in subsections (1) and (2) of this section represent averages with the lowest level in an area to be no less than fifty percent of the indicated value.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-165, filed 1/21/86; Order 74-26, § 296-155-165, filed 5/7/74, effective 6/6/74.]

WAC 296-155-170 Ventilation. (1) General. Whenever hazardous substances such as dusts, fumes, mists, vapors, or gases exist or are produced in the course of construction work, their concentrations shall not exceed the limits specified in WAC 296-155-160(1). When ventilation is used as an engineering control method, the system shall be installed and operated according to the requirements of this section.

(2) Local exhaust ventilation. Local exhaust ventilation when used as described in (1) shall be designed to prevent dispersion into the air of dusts, fumes, mists, vapors, and

gases in concentrations causing harmful exposure. Such exhaust systems shall be so designed that dusts, fumes, mists, vapors, or gases are not drawn through the work area of employees.

(3) Design and operation. Exhaust fans, jets, ducts, hoods, separators, and all necessary appurtenances, including refuse receptacles, shall be so designed, constructed, maintained and operated as to ensure the required protection by maintaining a volume and velocity of exhaust air sufficient to gather dusts, fumes, vapors, or gases from said equipment or process, and to convey them to suitable points of safe disposal, thereby preventing their dispersion in harmful quantities into the atmosphere where employees work.

(4) Duration of operations.

(a) The exhaust system shall be in operation continually during all operations which it is designed to serve. If the employee remains in the contaminated zone, the system shall continue to operate after the cessation of said operations, the length of time to depend upon the individual circumstances and effectiveness of the general ventilation system.

(b) Since dust capable of causing disability is, according to the best medical opinion, of microscopic size, tending to remain for hours in suspension in still air, it is essential that the exhaust system be continued in operation for a time after the work process or equipment served by the same shall have ceased, in order to ensure the removal of the harmful elements to the required extent.

Note: For the same reason, employees wearing respiratory equipment should not remove same immediately until a clear atmosphere has been established.

(5) Disposal of exhaust materials. The air outlet from every dust separator, and the dusts, fumes, mists, vapors, or gases collected by an exhaust or ventilating system shall discharge to the outside atmosphere. Collecting systems which return air to work area may be used if concentrations which accumulate in the work area air do not result in harmful exposure to employees. Dust and refuse discharged from an exhaust system shall be disposed of in such a manner that it will not result in harmful exposure to employees.

[Order 74-26, § 296-155-170, filed 5/7/74, effective 6/6/74.]

WAC 296-155-173 Methylene dianiline.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-155-173, filed 2/3/93, effective 3/15/93.]

WAC 296-155-17301 Scope and application. (1) This section applies to all construction work as defined in WAC 296-155-005, in which there is exposure to MDA, including but not limited to the following:

(a) Construction, alteration, repair, maintenance, or renovation of structures, substrates, or portions thereof, that contain MDA;

(b) Installation or the finishing of surfaces with products containing MDA;

(c) MDA spill/emergency cleanup at construction sites; and

(d) Transportation, disposal, storage, or containment of MDA or products containing MDA on the site or location at which construction activities are performed.

(2) Except as provided in subsection (7) of this section and WAC 296-155-17311(5), this standard does not apply to the processing, use, and handling of products containing MDA where initial monitoring indicates that the product is not capable of releasing MDA in excess of the action level under the expected conditions of processing, use, and handling which will cause the greatest possible release; and where no "dermal exposure to MDA" can occur.

(3) Except as provided in subsection (7) of this section, this standard does not apply to the processing, use, and handling of products containing MDA where objective data are reasonably relied upon which demonstrate the product is not capable of releasing MDA under the expected conditions of processing, use, and handling which will cause the greatest possible release; and where no "dermal exposure to MDA" can occur.

(4) Except as provided in subsection (7) of this section, this standard does not apply to the storage, transportation, distribution, or sale of MDA in intact containers sealed in such a manner as to contain the MDA dusts, vapors, or liquids, except for the provisions of WAC 296-62-054 and 296-155-17309.

(5) Except as provided in subsection (7) of this section, this standard does not apply to materials in any form which contain less than 0.1% MDA by weight or volume.

(6) Except as provided in subsection (7) of this section, this standard does not apply to "finished articles containing MDA."

(7) Where products containing MDA are exempted under subsections (2) and (6) of this section, the employer shall maintain records of the initial monitoring results or objective data supporting that exemption and the basis for the employer's reliance on the data, as provided in the recordkeeping provision of WAC 296-155-17331.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-155-17301, filed 2/3/93, effective 3/15/93.]

WAC 296-155-17303 Definitions. For the purpose of this standard, the following definitions shall apply:

(1) "Action level" means a concentration of airborne MDA of 5 ppb as an 8-hour time-weighted average.

(2) "Authorized person" means any person specifically authorized by the employer whose duties require the person to enter a regulated area, or any person entering such an area as a designated representative of employees for the purpose of exercising the right to observe monitoring and measuring procedures under WAC 296-155-17333, or any other person authorized by the act or regulations issued under the act.

(3) "Container" means any barrel, bottle, can, cylinder, drum, reaction vessel, storage tank, commercial packaging, or the like, but does not include piping systems.

(4) "Decontamination area" means an area outside of, but as near as practical to, the regulated area, consisting of an equipment storage area, wash area, and clean change area, which is used for the decontamination of workers, materials, and equipment contaminated with MDA.

(5) "Dermal exposure to MDA" occurs where employees are engaged in the handling, application, or use of mixtures or materials containing MDA, with any of the following nonairborne forms of MDA:

(a) Liquid, powdered, granular, or flaked mixtures containing MDA in concentrations greater than 0.1% by weight or volume; and

(b) Materials other than "finished articles" containing MDA in concentrations greater than 0.1% by weight or volume.

(6) "Director" means the director of the department of labor and industries.

(7) "Emergency" means any occurrence such as, but not limited to, equipment failure, rupture of containers, or failure of control equipment which results in an unexpected and potentially hazardous release of MDA.

(8) "Employee exposure" means exposure to MDA which would occur if the employee were not using respirators or protective work clothing and equipment.

(9) "Finished article containing MDA" is defined as a manufactured item:

(a) Which is formed to a specific shape or design during manufacture;

(b) Which has end use function(s) dependent in whole or part upon its shape or design during end use; and

(c) Where applicable, is an item which is fully cured by virtue of having been subjected to the conditions (temperature, time) necessary to complete the desired chemical reaction.

(10) "Historical monitoring data" means monitoring data for construction jobs that meet the following conditions:

(a) The data upon which judgments are based are scientifically sound and were collected using methods that are sufficiently accurate and precise;

(b) The processes and work practices that were in use when the historical monitoring data were obtained are essentially the same as those to be used during the job for which initial monitoring will not be performed;

(c) The characteristics of the MDA-containing material being handled when the historical monitoring data were obtained are the same as those on the job for which initial monitoring will not be performed;

(d) Environmental conditions prevailing when the historical monitoring data were obtained are the same as those on the job for which initial monitoring will not be performed; and

(e) Other data relevant to the operations, materials, processing, or employee exposures covered by the exception are substantially similar. The data must be scientifically sound, the characteristics of the MDA containing material must be similar, and the environmental conditions comparable.

(11) "4,4' methylenedianiline" or "MDA" means the chemical 4,4'-diaminodiphenylmethane, Chemical Abstract Service Registry Number 101-77-9, in the form of a vapor, liquid, or solid. The definition also includes the salts of MDA.

(12) "Regulated areas" means areas where airborne concentrations of MDA exceed or can reasonably be expected to exceed, the permissible exposure limits, or where "dermal exposure to MDA" can occur.

(13) "STEL" means short-term exposure limit as determined by any 15-minute sample period.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-155-17303, filed 2/3/93, effective 3/15/93.]

WAC 296-155-17305 Permissible exposure limits.

The employer shall assure that no employee is exposed to an airborne concentration of MDA in excess of ten parts per billion (10 ppb) as an 8-hour time-weighted average and a STEL of one hundred parts per billion (100 ppb).

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-155-17305, filed 2/3/93, effective 3/15/93.]

WAC 296-155-17307 Communication among employers. On multi-employer worksites, an employer performing work involving the application of MDA or materials containing MDA for which establishment of one or more regulated areas is required shall inform other employers on the site of the nature of the employer's work with MDA and of the existence of, and requirements pertaining to, regulated areas.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-155-17307, filed 2/3/93, effective 3/15/93.]

WAC 296-155-17309 Emergency situations. (1) Written plan.

(a) A written plan for emergency situations shall be developed for each construction operation where there is a possibility of an emergency. The plan shall include procedures where the employer identifies emergency escape routes for her or his employees at each construction site before the construction operation begins. Appropriate portions of the plan shall be implemented in the event of an emergency.

(b) The plan shall specifically provide that employees engaged in correcting emergency conditions shall be equipped with the appropriate personal protective equipment and clothing as required in WAC 296-155-17317 and 296-155-17319 until the emergency is abated.

(c) The plan shall specifically include provisions for alerting and evacuating affected employees as well as the applicable elements prescribed in WAC 296-24-567, "Employee emergency plans and fire prevention plans."

(2) Alerting employees. Where there is the possibility of employee exposure to MDA due to an emergency, means shall be developed to promptly alert employees who have the potential to be directly exposed. Affected employees not engaged in correcting emergency conditions shall be evacuated immediately in the event that an emergency occurs. Means shall also be developed for alerting other employees who may be exposed as a result of the emergency.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-155-17309, filed 2/3/93, effective 3/15/93.]

WAC 296-155-17311 Exposure monitoring. (1) General.

(a) Determinations of employee exposure shall be made from breathing zone air samples that are representative of each employee's exposure to airborne MDA over an 8-hour period. Determination of employee exposure to the STEL shall be made from breathing zone air samples collected over a 15 minute sampling period.

(b) Representative employee exposure shall be determined on the basis of one or more samples representing full

shift exposure for each shift for each job classification in each work area where exposure to MDA may occur.

(c) Where the employer can document that exposure levels are equivalent for similar operations in different work shifts, the employer shall only be required to determine representative employee exposure for that operation during one shift.

(2) Initial monitoring. Each employer who has a workplace or work operation covered by this standard shall perform initial monitoring to determine accurately the airborne concentrations of MDA to which employees may be exposed unless:

(a) The employer can demonstrate, on the basis of objective data, that the MDA-containing product or material being handled cannot cause exposures above the standard's action level, even under worst-case release conditions; or

(b) The employer has historical monitoring or other data demonstrating that exposures on a particular job will be below the action level.

(3) Periodic monitoring and monitoring frequency.

(a) If the monitoring required by subsection (2)(b) of this section reveals employee exposure at or above the action level, but at or below the PELs, the employer shall repeat such monitoring for each such employee at least every 6 months.

(b) If the monitoring required by subsection (2)(b) of this section reveals employee exposure above the PELs, the employer shall repeat such monitoring for each such employee at least every 3 months.

(c) Employers who are conducting MDA operations within a regulated area can forego periodic monitoring if the employees are all wearing supplied-air respirators while working in the regulated area.

(d) The employer may alter the monitoring schedule from every three months to every six months for any employee for whom two consecutive measurements taken at least 7 days apart indicate that the employee exposure has decreased to below the PELs but above the action level.

(4) Termination of monitoring.

(a) If the initial monitoring required by subsection (2)(b) of this section reveals employee exposure to be below the action level, the employer may discontinue the monitoring for that employee, except as otherwise required by subsection (5) of this section.

(b) If the periodic monitoring required by subsection (3) of this section reveals that employee exposures, as indicated by at least two consecutive measurements taken at least 7 days apart, are below the action level the employer may discontinue the monitoring for that employee, except as otherwise required by subsection (5) of this section.

(5) Additional monitoring. The employer shall institute the exposure monitoring required under subsections (2)(b) and (c) of this section when there has been a change in production process, chemicals present, control equipment, personnel, or work practices which may result in new or additional exposures to MDA, or when the employer has any reason to suspect a change which may result in new or additional exposures.

(6) Accuracy of monitoring. Monitoring shall be accurate, to a confidence level of 95 percent, to within plus or minus 25 percent for airborne concentrations of MDA.

(7) Employee notification of monitoring results.

(a) The employer shall, within 15 working days after the receipt of the results of any monitoring performed under this standard, notify each employee of these results, in writing, either individually or by posting of results in an appropriate location that is accessible to affected employees.

(b) The written notification required by subdivision (a) of this subsection shall contain the corrective action being taken by the employer or any other protective measures which have been implemented to reduce the employee exposure to or below the PELs, wherever the PELs are exceeded.

(8) Visual monitoring. The employer shall make routine inspections of employee hands, face, and forearms potentially exposed to MDA. Other potential dermal exposures reported by the employee must be referred to the appropriate medical personnel for observation. If the employer determines that the employee has been exposed to MDA the employer shall:

(a) Determine the source of exposure;

(b) Implement protective measures to correct the hazard; and

(c) Maintain records of the corrective actions in accordance with WAC 296-155-17327.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-155-17311, filed 2/3/93, effective 3/15/93.]

WAC 296-155-17313 Regulated areas. (1) Establishment.

(a) Airborne exposures. The employer shall establish regulated areas where airborne concentrations of MDA exceed, or can reasonably be expected to exceed, the permissible exposure limits.

(b) Dermal exposures. Where employees are subject to "dermal exposure to MDA" the employer shall establish those work areas as regulated areas.

(2) Demarcation. Regulated areas shall be demarcated from the rest of the workplace in a manner that minimizes the number of persons potentially exposed.

(3) Access. Access to regulated areas shall be limited to authorized persons.

(4) Personal protective equipment and clothing. Each person entering a regulated area shall be supplied with, and required to use, the appropriate personal protective clothing and equipment in accordance with WAC 296-155-17317 and 296-155-17319.

(5) Prohibited activities. The employer shall ensure that employees do not eat, drink, smoke, chew tobacco or gum, or apply cosmetics in regulated areas.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-155-17313, filed 2/3/93, effective 3/15/93.]

WAC 296-155-17315 Methods of compliance. (1) Engineering controls and work practices and respirators.

(a) The employer shall use one or any combination of the following control methods to achieve compliance with the permissible exposure limits prescribed by WAC 296-155-17317.

(i) Local exhaust ventilation equipped with HEPA filter dust collection systems;

(ii) General ventilation systems;

(iii) Use of work practices; or

(iv) Other engineering controls such as isolation and enclosure that the director can show to be feasible.

(b) Wherever the feasible engineering controls and work practices which can be instituted are not sufficient to reduce employee exposure to or below the PELs, the employer shall use them to reduce employee exposure to the lowest levels achievable by these controls and shall supplement them by the use of respiratory protective devices which comply with the requirements of WAC 296-155-17317.

(2) Special provisions. For workers engaged in spray application methods, respiratory protection must be used in addition to feasible engineering controls and work practices to reduce employee exposure to or below the PELs.

(3) Prohibitions. Compressed air shall not be used to remove MDA unless the compressed air is used in conjunction with an enclosed ventilation system designed to capture the dust cloud created by the compressed air.

(4) Employee rotation. The employer shall not use employee rotation as a means of compliance with the exposure limits prescribed in WAC 296-155-17305.

(5) Compliance program.

(a) The employer shall establish and implement a written program to reduce employee exposure to or below the PELs by means of engineering and work practice controls, as required by subsection (1) of this section, and by use of respiratory protection where permitted under this section.

(b) Upon request this written program shall be furnished for examination and copying to the director, affected employees, and designated employee representatives. The employer shall review and, as necessary, update such plans at least once every 12 months to make certain they reflect the current status of the program.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-155-17315, filed 2/3/93, effective 3/15/93.]

WAC 296-155-17317 Respiratory protection. (1)

General. The employer shall provide respirators, and ensure that they are used, where required by this section. Respirators shall be used in the following circumstances:

(a) During the time period necessary to install or implement feasible engineering and work practice controls;

(b) In work operations such as maintenance and repair activities and spray application processes for which engineering and work practice controls are not feasible;

(c) In work situations where feasible engineering and work practice controls are not yet sufficient to reduce exposure to or below the PELs; and

(d) In emergencies.

(2) Respirator selection.

(a) Where respirators are required or allowed under this section, the employer shall select and provide, at no cost to the employee, the appropriate respirator as specified in Table 1, and shall assure that the employee uses the respirator provided.

(b) The employer shall select respirators from among those jointly approved by the Mine Safety and Health Administration and the National Institute for Occupational Safety and Health under the provisions of 30 CFR part 11 and chapter 296-62 WAC, Part E.

(c) Any employee who cannot wear a negative-pressure respirator shall be given the option of wearing a positive-pressure respirator or any supplied-air respirator operated in the continuous flow or pressure demand mode.

(3) Respirator program. The employer shall institute a respiratory protection program in accordance with chapter 296-62 WAC, Part E.

(4) Respirator use.

(a) Where air-purifying respirators (cartridge or canister) are used, the employer shall replace the air-purifying element as needed to maintain the effectiveness of the respirator. The employer shall ensure that each cartridge is dated at the beginning of use.

(b) Employees who wear respirators shall be allowed to leave the regulated area to readjust the face piece or to wash their faces and to wipe clean the face pieces on their respirators in order to minimize potential skin irritation associated with respirator use.

(c) Table 1.—Respiratory Protection for MDA

Airborne concentration of MDA or condition of use	Respirator type
a. Less than or equal to 10xPEL	(1) Half-mask respirator with HEPA ¹ cartridge. ²
b. Less than or equal to 50xPEL	(1) Full facepiece respirator with HEPA ¹ cartridge or canister. ²
c. Less than or equal to 1000xPEL	(1) Full facepiece powered air-purifying respirator with HEPA ¹ cartridges. ²
d. Greater than 1000xPEL or unknown	(1) Self-contained breathing concentration apparatus with full facepiece in positive pressure mode; (2) Full facepiece positive-pressure demand supplied-air respirator with auxiliary self-contained air supply.
e. Escape	(1) Any full facepiece air-purifying respirator with HEPA ¹ cartridges; ² (2) Any positive pressure or continuous flow self-contained breathing apparatus with full facepiece or hood.
f. Fire fighting	(1) Full facepiece self-contained breathing apparatus in positive pressure mode.

Note: Respirators assigned for higher environmental concentrations may be used at lower concentrations.

¹High efficiency particulate in air filter (HEPA) means a filter that is at least 99.97 percent efficient against mono-dispersed particles of 0.3 micrometers or larger.

²Combination HEPA/organic vapor cartridges shall be used whenever MDA in liquid form or a process requiring heat is used.

(5) Respirator fit testing.

(a) The employer shall perform and record the results of either quantitative or qualitative fit tests at the time of initial fitting and at least annually thereafter for each employee wearing a negative-pressure respirator. The test shall be used to select a respirator facepiece which provides the required protection as prescribed in subsection (4)(c) of this section, Table 1.

(b) The employer shall follow the test protocols outlined in Appendix E of this standard for whichever type of fit testing the employer chooses.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-155-17317, filed 2/3/93, effective 3/15/93.]

WAC 296-155-17319 Protective work clothing and equipment. (1) Provision and use. Where employees are subject to dermal exposure to MDA, where liquids containing MDA can be splashed into the eyes, or where airborne concentrations of MDA are in excess of the PEL, the employer shall provide, at no cost to the employee, and ensure that the employee uses, appropriate protective work clothing and equipment which prevent contact with MDA such as, but not limited to:

- (a) Aprons, coveralls, or other full-body work clothing;
- (b) Gloves, head coverings, and foot coverings; and
- (c) Face shields, chemical goggles; or
- (d) Other appropriate protective equipment which

comply with WAC 296-24-078.

(2) Removal and storage.

(a) The employer shall ensure that, at the end of their work shift, employees remove MDA-contaminated protective work clothing and equipment that is not routinely removed throughout the day in change areas provided in accordance with the provisions in WAC 296-155-17321.

(b) The employer shall ensure that, during their work shift, employees remove all other MDA-contaminated protective work clothing or equipment before leaving a regulated area.

(c) The employer shall ensure that no employee takes MDA-contaminated work clothing or equipment out of the decontamination areas, except those employees authorized to do so for the purpose of laundering, maintenance, or disposal.

(d) MDA-contaminated work clothing or equipment shall be placed and stored and transported in sealed, impermeable bags, or other closed impermeable containers.

(e) Containers of MDA-contaminated protective work clothing or equipment which are to be taken out of decontamination areas or the workplace for cleaning, maintenance, or disposal, shall bear labels warning of the hazards of MDA.

(3) Cleaning and replacement.

(a) The employer shall provide the employee with clean protective clothing and equipment. The employer shall ensure that protective work clothing or equipment required by this section is cleaned, laundered, repaired, or replaced at intervals appropriate to maintain its effectiveness.

(b) The employer shall prohibit the removal of MDA from protective work clothing or equipment by blowing, shaking, or any methods which allow MDA to reenter the workplace.

(c) The employer shall ensure that laundering of MDA-contaminated clothing shall be done so as to prevent the release of MDA in the workplace.

(d) Any employer who gives MDA-contaminated clothing to another person for laundering shall inform such person of the requirement to prevent the release of MDA.

(e) The employer shall inform any person who launders or cleans protective clothing or equipment contaminated with MDA of the potentially harmful effects of exposure.

(4) Visual examination.

(a) The employer shall ensure that employees' work clothing is examined periodically for rips or tears that may occur during performance of work.

(b) When rips or tears are detected, the protective equipment or clothing shall be repaired and replaced immediately.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-155-17319, filed 2/3/93, effective 3/15/93.]

WAC 296-155-17321 Hygiene facilities and practices. (1) General.

(a) The employer shall provide decontamination areas for employees required to work in regulated areas or required by WAC 296-155-17319 to wear protective clothing. Exception: In lieu of the decontamination area requirement specified in this subsection, the employer may permit employees engaged in small scale, short duration operations, to clean their protective clothing or dispose of the protective clothing before such employees leave the area where the work was performed.

(b) Change areas. The employer shall ensure that change areas are equipped with separate storage facilities for protective clothing and street clothing, in accordance with WAC 296-24-12011.

(c) Equipment area. The equipment area shall be supplied with impermeable, labeled bags and containers for the containment and disposal of contaminated protective clothing and equipment.

(2) Shower area.

(a) Where feasible, shower facilities shall be provided which comply with WAC 296-24-12009(3) wherever the possibility of employee exposure to airborne levels of MDA in excess of the permissible exposure limit exists.

(b) Where dermal exposure to MDA occurs, the employer shall ensure that materials spilled or deposited on the skin are removed as soon as possible by methods which do not facilitate the dermal absorption of MDA.

(3) Lunch areas.

(a) Whenever food or beverages are consumed at the worksite and employees are exposed to MDA the employer shall provide clean lunch areas where MDA levels are below the action level and where no dermal exposure to MDA can occur.

(b) The employer shall ensure that employees wash their hands and faces with soap and water prior to eating, drinking, smoking, or applying cosmetics.

(c) The employer shall ensure that employees do not enter lunch facilities with contaminated protective work clothing or equipment.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-155-17321, filed 2/3/93, effective 3/15/93.]

WAC 296-155-17323 Communication of hazards to employees. (1) Signs and labels.

(a) The employer shall post and maintain legible signs demarcating regulated areas and entrances or accessways to regulated areas that bear the following legend:

DANGER MDA MAY CAUSE CANCER LIVER TOXIN
AUTHORIZED PERSONNEL ONLY
RESPIRATORS AND PROTECTIVE CLOTHING
MAY BE REQUIRED TO BE WORN IN THIS AREA

(b) The employer shall ensure that labels or other appropriate forms of warning are provided for containers of MDA within the workplace. The labels shall comply with the requirements of WAC 296-62-05411 and shall include one of the following legends:

(i) For pure MDA

DANGER CONTAINS MDA MAY CAUSE CANCER LIVER TOXIN

(ii) For mixtures containing MDA

DANGER CONTAINS MDA CONTAINS MATERIALS
WHICH MAY CAUSE CANCER LIVER TOXIN

(2) Material safety data sheets (MSDS). Employers shall obtain or develop, and shall provide access to their employees to, a material safety data sheet (MSDS) for MDA.

(3) Information and training.

(a) The employer shall provide employees with information and training on MDA, in accordance with WAC 296-62-054 through 296-62-05415, at the time of initial assignment and at least annually thereafter.

(b) In addition to the information required under WAC 296-62-054, the employer shall:

(i) Provide an explanation of the contents of this section, including Appendices A and B of this section, and indicate to employees where a copy of the standard is available;

(ii) Describe the medical surveillance program required under WAC 296-155-17327, and explain the information contained in Appendix C of this standard; and

(iii) Describe the medical removal provision required under WAC 296-155-17327.

(4) Access to training materials.

(a) The employer shall make readily available to all affected employees, without cost, all written materials relating to the employee training program, including a copy of this regulation.

(b) The employer shall provide to the director, upon request, all information and training materials relating to the employee information and training program.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-155-17323, filed 2/3/93, effective 3/15/93.]

WAC 296-155-17325 Housekeeping. (1) All surfaces shall be maintained as free as practicable of visible accumulations of MDA.

(2) The employer shall institute a program for detecting MDA leaks, spills, and discharges, including regular visual inspections of operations involving liquid or solid MDA.

(3) All leaks shall be repaired and liquid or dust spills cleaned up promptly.

(4) Surfaces contaminated with MDA may not be cleaned by the use of compressed air.

(5) Shoveling, dry sweeping, and other methods of dry clean-up of MDA may be used where HEPA-filtered vacuuming and/or wet cleaning are not feasible or practical.

(6) Waste, scrap, debris, bags, containers, equipment, and clothing contaminated with MDA shall be collected and disposed of in a manner to prevent the reentry of MDA into the workplace.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-155-17325, filed 2/3/93, effective 3/15/93.]

(1997 Ed.)

WAC 296-155-17327 Medical surveillance. (1) General.

(a) The employer shall make available a medical surveillance program for employees exposed to MDA under the following circumstances:

(i) Employees exposed at or above the action level for 30 or more days per year;

(ii) Employees who are subject to dermal exposure to MDA for 15 or more days per year;

(iii) Employees who have been exposed in an emergency situation;

(iv) Employees whom the employer, based on results from compliance with WAC 296-155-17311(8) has reason to believe are being dermally exposed; and

(v) Employees who show signs or symptoms of MDA exposure.

(b) The employer shall ensure that all medical examinations and procedures are performed by or under the supervision of a licensed physician at a reasonable time and place, and provided without cost to the employee.

(2) Initial examinations.

(a) Within 150 days of the effective date of this standard, or before the time of initial assignment, the employer shall provide each employee covered by subsection (1)(a) of this section with a medical examination including the following elements:

A detailed history which includes:

(i) Past work exposure to MDA or any other toxic substances;

(ii) A history of drugs, alcohol, tobacco, and medication routinely taken (duration and quantity); and

(iii) A history of dermatitis, chemical skin sensitization, or previous hepatic disease.

(iv) A physical examination which includes all routine physical examination parameters, skin examination, and examination for signs of liver disease.

(v) Laboratory tests including:

(A) Liver function tests; and

(B) Urinalysis.

(vi) Additional tests as necessary in the opinion of the physician.

(b) No initial medical examination is required if adequate records show that the employee has been examined in accordance with the requirements of this section within the previous six months prior to the effective date of this standard or prior to the date of initial assignment.

(3) Periodic examinations.

(a) The employer shall provide each employee covered by this section with a medical examination at least annually following the initial examination. These periodic examinations shall include at least the following elements:

(i) A brief history regarding any new exposure to potential liver toxins, changes in drug, tobacco, and alcohol intake, and the appearance of physical signs relating to the liver and the skin;

(ii) The appropriate tests and examinations including liver function tests and skin examinations; and

(iii) Appropriate additional tests or examinations as deemed necessary by the physician.

(b) If in the physician's opinion the results of liver function tests indicate an abnormality, the employee shall be removed from further MDA exposure in accordance with

WAC 296-155-17329. Repeat liver function tests shall be conducted on advice of the physician.

(4) Emergency examinations. If the employer determines that the employee has been exposed to a potentially hazardous amount of MDA in an emergency situation under WAC 296-155-17309, the employer shall provide medical examinations in accordance with subsection (3)(a) and (b). If the results of liver function testing indicate an abnormality, the employee shall be removed in accordance with WAC 296-155-17329. Repeat liver function tests shall be conducted on the advice of the physician. If the results of the tests are normal, tests must be repeated two to three weeks from the initial testing. If the results of the second set of tests are normal and on the advice of the physician, no additional testing is required.

(5) Additional examinations. Where the employee develops signs and symptoms associated with exposure to MDA, the employer shall provide the employee with an additional medical examination including liver function tests. Repeat liver function tests shall be conducted on the advice of the physician. If the results of the tests are normal, tests must be repeated two to three weeks from the initial testing. If the results of the second set of tests are normal and on the advice of the physician, no additional testing is required.

(6) Multiple physician review mechanism.

(a) If the employer selects the initial physician who conducts any medical examination or consultation provided to an employee under this section, and the employee has signs or symptoms of occupational exposure to MDA (which could include an abnormal liver function test), and the employee disagrees with the opinion of the examining physician, and this opinion could affect the employee's job status, the employee may designate an appropriate and mutually acceptable second physician:

(i) To review any findings, determinations, or recommendations of the initial physician; and

(ii) To conduct such examinations, consultations, and laboratory tests as the second physician deems necessary to facilitate this review.

(b) The employer shall promptly notify an employee of the right to seek a second medical opinion after each occasion that an initial physician conducts a medical examination or consultation pursuant to this section. The employer may condition its participation in, and payment for, the multiple physician review mechanism upon the employee doing the following within 15 days after receipt of the foregoing notification, or receipt of the initial physician's written opinion, whichever is later:

(i) The employee informing the employer that he or she intends to seek a second medical opinion; and

(ii) The employee initiating steps to make an appointment with a second physician.

(c) If the findings, determinations, or recommendations of the second physician differ from those of the initial physician, then the employer and the employee shall assure that efforts are made for the two physicians to resolve any disagreement.

(d) If the two physicians have been unable to quickly resolve their disagreement, then the employer and the employee through their respective physicians shall designate a third physician:

(i) To review any findings, determinations, or recommendations of the prior physicians; and

(ii) To conduct such examinations, consultations, laboratory tests, and discussions with the prior physicians as the third physician deems necessary to resolve the disagreement of the prior physicians.

(e) The employer shall act consistent with the findings, determinations, and recommendations of the second physician, unless the employer and the employee reach a mutually acceptable agreement.

(f) Information provided to the examining physician.

(i) The employer shall provide the following information to the examining physician:

(A) A copy of this regulation and its appendices;

(B) A description of the affected employee's duties as they relate to the employee's potential exposure to MDA;

(C) The employee's current actual or representative MDA exposure level;

(D) A description of any personal protective equipment used or to be used; and

(E) Information from previous employment related medical examinations of the affected employee.

(ii) The employer shall provide the foregoing information to a second physician under this section upon request either by the second physician, or by the employee.

(g) Physician's written opinion.

(i) For each examination under this section, the employer shall obtain, and provide the employee with a copy of, the examining physician's written opinion within 15 days of its receipt. The written opinion shall include the following:

(A) The occupationally pertinent results of the medical examination and tests;

(B) The physician's opinion concerning whether the employee has any detected medical conditions which would place the employee at increased risk of material impairment of health from exposure to MDA;

(C) The physician's recommended limitations upon the employee's exposure to MDA or upon the employee's use of protective clothing or equipment and respirators; and

(D) A statement that the employee has been informed by the physician of the results of the medical examination and any medical conditions resulting from MDA exposure which require further explanation or treatment.

(ii) The written opinion obtained by the employer shall not reveal specific findings or diagnoses unrelated to occupational exposures.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-155-17327, filed 2/3/93, effective 3/15/93.]

WAC 296-155-17329 Medical removal. (1) Temporary medical removal of an employee.

(a) Temporary removal resulting from occupational exposure. The employee shall be removed from work environments in which exposure to MDA is at or above the action level or where dermal exposure to MDA may occur, following an initial examination (WAC 296-155-17327(2)), periodic examinations (WAC 296-155-17327(3)), an emergency situation (WAC 296-155-17327(4)), or an additional examination (WAC 296-155-17327(5)) in the following circumstances:

(i) When the employee exhibits signs and/or symptoms indicative of acute exposure to MDA; or

(ii) When the examining physician determines that an employee's abnormal liver function tests are not associated with MDA exposure but that the abnormalities may be exacerbated as a result of occupational exposure to MDA.

(b) Temporary removal due to a final medical determination.

(i) The employer shall remove an employee from work having an exposure to MDA at or above the action level or where the potential for dermal exposure exists on each occasion that a final medical determination results in a medical finding, determination, or opinion that the employee has a detected medical condition which places the employee at increased risk of material impairment to health from exposure to MDA.

(ii) For the purposes of this section, the phrase "final medical determination" shall mean the outcome of the physician review mechanism used pursuant to the medical surveillance provisions of this section.

(iii) Where a final medical determination results in any recommended special protective measures for an employee, or limitations on an employee's exposure to MDA, the employer shall implement and act consistent with the recommendation.

(2) Return of the employee to former job status.

(a) The employer shall return an employee to her or his former job status:

(i) When the employee no longer shows signs or symptoms of exposure to MDA, or upon the advice of the physician.

(ii) When a subsequent final medical determination results in a medical finding, determination, or opinion that the employee no longer has a detected medical condition which places the employee at increased risk of material impairment to health from exposure to MDA.

(b) For the purposes of this section, the requirement that an employer return an employee to his or her former job status is not intended to expand upon or restrict any rights an employee has or would have had, absent temporary medical removal, to a specific job classification or position under the terms of a collective bargaining agreement.

(3) Removal of other employee special protective measure or limitations. The employer shall remove any limitations placed on an employee or end any special protective measures provided to an employee pursuant to a final medical determination when a subsequent final medical determination indicates that the limitations or special protective measures are no longer necessary.

(4) Employer options pending a final medical determination. Where the physician review mechanism used pursuant to the medical surveillance provisions of this section has not yet resulted in a final medical determination with respect to an employee, the employer shall act as follows:

(a) Removal. The employer may remove the employee from exposure to MDA, provide special protective measures to the employee, or place limitations upon the employee, consistent with the medical findings, determinations, or recommendations of the physician who has reviewed the employee's health status.

(b) Return. The employer may return the employee to her or his former job status, and end any special protective

measures provided to the employee, consistent with the medical findings, determinations, or recommendations of any of the physicians who have reviewed the employee's health status, with two exceptions:

(i) If the initial removal, special protection, or limitation of the employee resulted from a final medical determination which differed from the findings, determinations, or recommendations of the initial physician; or

(ii) The employee has been on removal status for the preceding six months as a result of exposure to MDA, then the employer shall await a final medical determination.

(5) Medical removal protection benefits.

(a) Provisions of medical removal protection benefits. The employer shall provide to an employee up to six months of medical removal protection benefits on each occasion that an employee is removed from exposure to MDA or otherwise limited pursuant to this section.

(b) Definition of medical removal protection benefits. For the purposes of this section, the requirement that an employer provide medical removal protection benefits means that the employer shall maintain the earnings, seniority, and other employment rights and benefits of an employee as though the employee had not been removed from normal exposure to MDA or otherwise limited.

(c) Follow-up medical surveillance during the period of employee removal or limitations. During the period of time that an employee is removed from normal exposure to MDA or otherwise limited, the employer may condition the provision of medical removal protection benefits upon the employee's participation in follow-up medical surveillance made available pursuant to this section.

(d) Workers' compensation claims. If a removed employee files a claim for workers' compensation payments for an MDA-related disability, then the employer shall continue to provide medical removal protection benefits pending disposition of the claim. To the extent that an award is made to the employee for earnings lost during the period of removal, the employer's medical removal protection obligation shall be reduced by such amount. The employer shall receive no credit for workers' compensation payments received by the employee for treatment-related expenses.

(e) Other credits. The employer's obligation to provide medical removal protection benefits to a removed employee shall be reduced to the extent that the employee receives compensation for earnings lost during the period of removal either from a publicly or employer-funded compensation program, or receives income from employment with any employer made possible by virtue of the employee's removal.

(f) Employees who do not recover within the 6 months of removal. The employer shall take the following measures with respect to any employee removed from exposure to MDA:

(i) The employer shall make available to the employee a medical examination pursuant to this section to obtain a final medical determination with respect to the employee;

(ii) The employer shall assure that the final medical determination obtained indicates whether or not the employee may be returned to her or his former job status, and, if not, what steps should be taken to protect the employee's health;

(iii) Where the final medical determination has not yet been obtained, or once obtained indicates that the employee may not yet be returned to her or his former job status, the employer shall continue to provide medical removal protection benefits to the employee until either the employee is returned to former job status, or a final medical determination is made that the employee is incapable of ever safely returning to her or his former job status; and

(iv) Where the employer acts pursuant to a final medical determination which permits the return of the employee to her or his former job status despite what would otherwise be an unacceptable liver function test, later questions concerning removing the employee again shall be decided by a final medical determination. The employer need not automatically remove such an employee pursuant to the MDA removal criteria provided by this section.

(6) Voluntary removal or restriction of an employee. Where an employer, although not required by this section to do so, removes an employee from exposure to MDA or otherwise places limitations on an employee due to the effects of MDA exposure on the employee's medical condition, the employer shall provide medical removal protection benefits to the employee equal to that required by subsection (5) of this section.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-155-17329, filed 2/3/93, effective 3/15/93.]

WAC 296-155-17331 Recordkeeping. (1) Objective data for exempted operations.

(a) Where the employer has relied on objective data that demonstrate that products made from or containing MDA are not capable of releasing MDA or do not present a dermal exposure problem under the expected conditions of processing, use, or handling to exempt such operations from the initial monitoring requirements under WAC 296-155-17311(2), the employer shall establish and maintain an accurate record of objective data reasonably relied upon in support of the exemption.

(b) The record shall include at least the following information:

- (i) The product qualifying for exemption;
- (ii) The source of the objective data;
- (iii) The testing protocol, results of testing, and/or analysis of the material for the release of MDA;
- (iv) A description of the operation exempted and how the data support the exemption; and
- (v) Other data relevant to the operations, materials, processing, or employee exposures covered by the exemption.

(c) The employer shall maintain this record for the duration of the employer's reliance upon such objective data.

(2) Historical monitoring data.

(a) Where the employer has relied on historical monitoring data that demonstrate that exposures on a particular job will be below the action level to exempt such operations from the initial monitoring requirements under WAC 296-155-17311(2), the employer shall establish and maintain an accurate record of historical monitoring data reasonably relied upon in support of the exemption.

(b) The record shall include information that reflect the following conditions:

(i) The data upon which judgments are based are scientifically sound and were collected using methods that are sufficiently accurate and precise;

(ii) The processes and work practices that were in use when the historical monitoring data were obtained are essentially the same as those to be used during the job for which initial monitoring will not be performed;

(iii) The characteristics of the MDA-containing material being handled when the historical monitoring data were obtained are the same as those on the job for which initial monitoring will not be performed;

(iv) Environmental conditions prevailing when the historical monitoring data were obtained are the same as those on the job for which initial monitoring will not be performed; and

(v) Other data relevant to the operations, materials, processing, or employee exposures covered by the exception.

(c) The employer shall maintain this record for the duration of the employer's reliance upon such historical monitoring data.

(3) The employer may utilize the services of competent organizations such as industry trade associations and employee associations to maintain the records required by this section.

(4) Exposure measurements.

(a) The employer shall keep an accurate record of all measurements taken to monitor employee exposure to MDA.

(b) This record shall include at least the following information:

- (i) The date of measurement;
- (ii) The operation involving exposure to MDA;
- (iii) Sampling and analytical methods used and evidence of their accuracy;
- (iv) Number, duration, and results of samples taken;
- (v) Type of protective devices worn, if any; and
- (vi) Name, Social Security number, and exposure of the employees whose exposures are represented.

(c) The employer shall maintain this record for at least thirty years in accordance with chapter 296-62 WAC, Part B.

(5) Medical surveillance.

(a) The employer shall establish and maintain an accurate record for each employee subject to medical surveillance by WAC 296-155-17327 in accordance with chapter 296-62 WAC, Part B.

(b) The record shall include at least the following information:

- (i) The name and Social Security number of the employee;
- (ii) A copy of the employee's medical examination results, including the medical history, questionnaire responses, results of any tests, and physician's recommendations;
- (iii) Physician's written opinions;
- (iv) Any employee medical complaints related to exposure to MDA; and
- (v) A copy of the information provided to the physician as required by WAC 296-155-17327.

(c) The employer shall ensure that this record is maintained for the duration of employment plus thirty years in accordance with chapter 296-62 WAC, Part B.

(d) A copy of the employee's medical removal and return to work status.

(6) Training records. The employer shall maintain all employee training records for one year beyond the last date of employment.

(7) Availability.

(a) The employer, upon written request, shall make all records required to be maintained by this section available to the assistant secretary and the director for examination and copying.

(b) The employer, upon request, shall make any exposure records required by WAC 296-155-17311 and 296-155-17327 available for examination and copying to affected employees, former employees, designated representatives, and the director, in accordance with WAC 296-62-05201 through 296-62-05209 and 296-62-05213 through 296-62-05223.

(c) The employer, upon request, shall make employee medical records required by WAC 296-155-17327 and this section available for examination and copying to the subject employee, anyone having the specific written consent of the subject employee, and the director in accordance with chapter 296-62 WAC, Part B.

(8) Transfer of records.

(a) The employer shall comply with the requirements concerning transfer of records set forth in WAC 296-62-05215.

(b) Whenever the employer ceases to do business and there is no successor employer to receive and retain the records for the prescribed period, the employer shall notify the director at least 90 days prior to disposal and, upon request, transmit them to the director.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-155-17331, filed 2/3/93, effective 3/15/93.]

WAC 296-155-17333 Observation of monitoring.

(1) Employee observation. The employer shall provide affected employees, or their designated representatives, an opportunity to observe the measuring or monitoring of employee exposure to MDA conducted pursuant to WAC 296-155-17311.

(2) Observation procedures. When observation of the measuring or monitoring of employee exposure to MDA requires entry into areas where the use of protective clothing and equipment or respirators is required, the employer shall provide the observer with personal protective clothing and equipment or respirators required to be worn by employees working in the area, assure the use of such clothing and equipment or respirators, and require the observer to comply with all other applicable safety and health procedures.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-155-17333, filed 2/3/93, effective 3/15/93.]

WAC 296-155-17335 Effective date. This standard shall become effective on March 15, 1993.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-155-17335, filed 2/3/93, effective 3/15/93.]

WAC 296-155-17337 Appendices. The information contained in Appendices A, B, C, and D of this standard is not intended by itself, to create any additional obligations not otherwise imposed by this standard nor detract from any

existing obligation. The protocols for respiratory fit testing in Appendix E of this standard are mandatory.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-155-17337, filed 2/3/93, effective 3/15/93.]

WAC 296-155-17339 Startup dates. Compliance with all obligations of this standard commence March 3, 1993, except as follows:

(1) Initial monitoring under WAC 296-155-17311(2) shall be completed as soon as possible but no later than June 3, 1993.

(2) Medical examinations under WAC 296-155-17327, shall be completed as soon as possible but no later than August 14, 1993.

(3) Emergency plans required by WAC 296-155-17309 shall be provided and available for inspection and copying as soon as possible but no later than July 13, 1993.

(4) Initial training and education shall be completed as soon as possible but no later than July 13, 1993.

(5) Decontamination and lunch areas under WAC 296-155-17321 shall be in operation as soon as possible but no later than March 3, 1993.

(6) Respiratory protection required by WAC 296-155-17317 shall be provided as soon as possible but no later than July 13, 1993.

(7) Written compliance plans required by WAC 296-155-17315(5) shall be completed and available for inspection and copying as soon as possible but no later than July 13, 1993.

(8) WISHA shall enforce the permissible exposure limits in WAC 296-155-17305 no earlier than July 13, 1993.

(9) Engineering controls needed to achieve the PELs must be in place March 3, 1993.

(10) Personal protective clothing required by WAC 296-155-17317 shall be available July 13, 1993.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-155-17339, filed 2/3/93, effective 3/15/93.]

WAC 296-155-17341 Appendix A to WAC 296-155-173—Substance data sheet, for 4-4'-methylenedianiline.

(1) Substance identification.

(a) Substance: Methylenedianiline (MDA).

(b) Permissible exposure:

(i) Airborne: Ten parts per billion parts of air (10 ppb), time-weighted average (TWA) for an 8-hour workday and an action level of five parts per billion parts of air (5 ppb).

(ii) Dermal: Eye contact and skin contact with MDA are not permitted.

(c) Appearance and odor: White to tan solid; amine odor.

(2) Health hazard data.

(a) Ways in which MDA affects your health. MDA can affect your health if you inhale it or if it comes in contact with your skin or eyes. MDA is also harmful if you happen to swallow it. Do not get MDA in eyes, on skin, or on clothing.

(b) Effects of overexposure.

(i) Short-term (acute) overexposure: Overexposure to MDA may produce fever, chills, loss of appetite, vomiting, jaundice. Contact may irritate skin, eyes, and mucous membranes. Sensitization may occur.

(ii) Long-term (chronic) exposure. Repeated or prolonged exposure to MDA, even at relatively low concentrations, may cause cancer. In addition, damage to the liver, kidneys, blood, and spleen may occur with long-term exposure.

(iii) Reporting signs and symptoms: You should inform your employer if you develop any signs or symptoms which you suspect are caused by exposure to MDA including yellow staining of the skin.

(3) Protective clothing and equipment.

(a) Respirators. Respirators are required for those operations in which engineering controls or work practice controls are not adequate or feasible to reduce exposure to the permissible limit. If respirators are worn, they must have the joint Mine Safety and Health Administration and National Institute for Occupational Safety and Health (NIOSH) seal of approval, and cartridges or canisters must be replaced as necessary to maintain the effectiveness of the respirator. If you experience difficulty breathing while wearing a respirator, you may request a positive-pressure respirator from your employer. You must be thoroughly trained to use the assigned respirator, and the training will be provided by your employer. MDA does not have a detectable odor except at levels well above the permissible exposure limits. Do not depend on odor to warn you when a respirator canister is exhausted. If you can smell MDA while wearing a respirator, proceed immediately to fresh air. If you experience difficulty breathing while wearing a respirator, tell your employer.

(b) Protective clothing. You may be required to wear coveralls, aprons, gloves, face shields, or other appropriate protective clothing to prevent skin contact with MDA. Where protective clothing is required, your employer is required to provide clean garments to you, as necessary, to assure that the clothing protects you adequately. Replace or repair impervious clothing that has developed leaks. MDA should never be allowed to remain on the skin. Clothing and shoes which are not impervious to MDA should not be allowed to become contaminated with MDA, and if they do, the clothing and shoes should be promptly removed and decontaminated. The clothing should be laundered to remove MDA or discarded. Once MDA penetrates shoes or other leather articles, they should not be worn again.

(c) Eye protection. You must wear splashproof safety goggles in areas where liquid MDA may contact your eyes. Contact lenses should not be worn in areas where eye contact with MDA can occur. In addition, you must wear a face shield if your face could be splashed with MDA liquid.

(4) Emergency and first aid procedures.

(a) Eye and face exposure. If MDA is splashed into the eyes, wash the eyes for at least 15 minutes. See a doctor as soon as possible.

(b) Skin exposure. If MDA is spilled on your clothing or skin, remove the contaminated clothing and wash the exposed skin with large amounts of soap and water immediately. Wash contaminated clothing before you wear it again.

(c) Breathing. If you or any other person breathes in large amounts of MDA, get the exposed person to fresh air at once. Apply artificial respiration if breathing has stopped. Call for medical assistance or a doctor as soon as possible. Never enter any vessel or confined space where the MDA concentration might be high without proper safety equipment

and at least one other person present who will stay outside. A life line should be used.

(d) Swallowing. If MDA has been swallowed and the patient is conscious, do not induce vomiting. Call for medical assistance or a doctor immediately.

(5) Medical requirements. If you are exposed to MDA at a concentration at or above the action level for more than 30 days per year, or exposed to liquid mixtures more than 15 days per year, your employer is required to provide a medical examination, including a medical history and laboratory tests, within 60 days of the effective date of this standard and annually thereafter. These tests shall be provided without cost to you. In addition, if you are accidentally exposed to MDA (either by ingestion, inhalation, or skin/eye contact) under conditions known or suspected to constitute toxic exposure to MDA, your employer is required to make special examinations and tests available to you.

(6) Observation of monitoring. Your employer is required to perform measurements that are representative of your exposure to MDA and you or your designated representative are entitled to observe the monitoring procedure. You are entitled to observe the steps taken in the measurement procedure and to record the results obtained. When the monitoring procedure is taking place in an area where respirators or personal protective clothing and equipment are required to be worn; you and your representative must also be provided with, and must wear, the protective clothing and equipment.

(7) Access to records. You or your representative are entitled to see the records of measurements of your exposure to MDA upon written request to your employer. Your medical examination records can be furnished to your physician or designated representative upon request by you to your employer.

(8) Precautions for safe use, handling, and storage.

(a) Material is combustible. Avoid strong acids and their anhydrides. Avoid strong oxidants. Consult supervisor for disposal requirements.

(b) Emergency clean-up. Wear self-contained breathing apparatus and fully clothe the body in the appropriate personal protective clothing and equipment.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-155-17341, filed 2/3/93, effective 3/15/93.]

WAC 296-155-17343 Appendix B to WAC 296-155-173—Substance technical guidelines, MDA. (1) Identification.

(a) Substance identification.

(i) Synonyms: CAS No. 101-77-9. 4,4'-methylenedianiline; 4,4'-methylenebis(aniline); methylenedianiline; dianilino-methane.

(ii) Formula: $C_{13}H_{14}N_2$.

(b) Physical data.

(2) Appearance and odor: White to tan solid; amine odor.

(a) Molecular weight: 198.26.

(b) Boiling point: 398-399 degrees C. at 760 mm Hg.

(c) Melting point: 88-93 degrees C. (190-100 degrees F.).

(d) Vapor pressure: 9 mm Hg at 232 degrees C.

- (e) Evaporation rate (n-butyl acetate=1): Negligible.
- (f) Vapor density (Air=1): Not applicable.
- (g) Volatile fraction by weight: Negligible.
- (h) Specific gravity (Water=1): Slight.
- (i) Heat of combustion: -8.40 kcal/g.
- (j) Solubility in water: Slightly soluble in cold water, very soluble in alcohol, benzene, ether, and many organic solvents.
- (3) Fire, explosion, and reactivity hazard data.
 - (a) Flash point: 190 degrees C. (374 degrees F.) Setaflash closed cup.
 - (b) Flash point: 226 degrees C. (439 degrees F.) Cleveland open cup.
 - (c) Extinguishing media: Water spray; dry chemical; carbon dioxide.
 - (d) Special fire fighting procedures: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.
 - (e) Unusual fire and explosion hazards: Fire or excessive heat may cause production of hazardous decomposition products.
- (4) Reactivity data.
 - (a) Stability: Stable.
 - (b) Incompatibility: Strong oxidizers.
 - (c) Hazardous decomposition products: As with any other organic material, combustion may produce carbon monoxide. Oxides of nitrogen may also be present.
 - (d) Hazardous polymerization: Will not occur.
- (5) Spill and leak procedures.
 - (a) Sweep material onto paper and place in fiber carton.
 - (b) Package appropriately for safe feed to an incinerator or dissolve in compatible waste solvents prior to incineration.
 - (c) Dispose of in an approved incinerator equipped with afterburner and scrubber or contract with licensed chemical waste disposal service.
 - (d) Discharge treatment or disposal may be subject to federal, state, or local laws.
 - (e) Wear appropriate personal protective equipment.
 - (6) Special storage and handling precautions.
 - (a) High exposure to MDA can occur when transferring the substance from one container to another. Such operations should be well ventilated and good work practices must be established to avoid spills.
 - (b) Pure MDA is a solid with a low vapor pressure. Grinding or heating operations increase the potential for exposure.
 - (c) Store away from oxidizing materials.
 - (d) Employers shall advise employees of all areas and operations where exposure to MDA could occur.
 - (7) Housekeeping and hygiene facilities.
 - (a) The workplace should be kept clean, orderly, and in a sanitary condition. The employer should institute a leak and spill detection program for operations involving MDA in order to detect sources of fugitive MDA emissions.
 - (b) Adequate washing facilities with hot and cold water are to be provided and maintained in a sanitary condition. Suitable cleansing agents should also be provided to assure the effective removal of MDA from the skin.
 - (8) Common operations. Common operations in which exposure to MDA is likely to occur include the following: Manufacture of MDA; manufacture of methylene diisocyan-

ate; curing agent for epoxy resin structures; wire coating operations; and filament winding.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-155-17343, filed 2/3/93, effective 3/15/93.]

WAC 296-155-17345 Appendix C to WAC 296-155-173—Medical surveillance guidelines for MDA. (1) Route of entry. Inhalation; skin absorption; ingestion. MDA can be inhaled, absorbed through the skin, or ingested.

(2) Toxicology. MDA is a suspect carcinogen in humans. There are several reports of liver disease in humans and animals resulting from acute exposure to MDA. A well documented case of an acute cardiomyopathy secondary to exposure to MDA is on record. Numerous human cases of hepatitis secondary to MDA are known. Upon direct contact MDA may also cause damage to the eyes. Dermatitis and skin sensitization have been observed. Almost all forms of acute environmental hepatic injury in humans involve the hepatic parenchyma and produce hepatocellular jaundice. This agent produces intrahepatic cholestasis. The clinical picture consists of cholestatic jaundice, preceded or accompanied by abdominal pain, fever, and chills. Onset in about 60% of all observed cases is abrupt with severe abdominal pain. In about 30% of observed cases, the illness presented and evolved more slowly and less dramatically, with only slight abdominal pain. In about 10% of the cases only jaundice was evident. The cholestatic nature of the jaundice is evident in the prominence of itching, the histologic predominance of bile stasis, and portal inflammatory infiltration, accompanied by only slight parenchymal injury in most cases, and by the moderately elevated transaminase values. Acute, high doses, however, have been known to cause hepatocellular damage resulting in elevated SGPT, SGOT, alkaline phosphatase, and bilirubin. Absorption through the skin is rapid. MDA is metabolized and excreted over a 48-hour period. Direct contact may be irritating to the skin, causing dermatitis. Also MDA which is deposited on the skin is not thoroughly removed through washing. MDA may cause bladder cancer in humans. Animal data supporting this assumption is not available nor is conclusive human data. However, human data collected on workers at a helicopter manufacturing facility where MDA is used suggests a higher incidence of bladder cancer among exposed workers.

(3) Signs and symptoms. Skin may become yellow from contact with MDA. Repeated or prolonged contact with MDA may result in recurring dermatitis (red-itchy, cracked skin) and eye irritation. Inhalation, ingestion, or absorption through the skin at high concentrations may result in hepatitis, causing symptoms such as fever and chills, nausea and vomiting, dark urine, anorexia, rash, right upper quadrant pain, and jaundice. Corneal burns may occur when MDA is splashed in the eyes.

(4) Treatment of acute toxic effects/emergency situation. If MDA gets into the eyes, immediately wash eyes with large amounts of water. If MDA is splashed on the skin, immediately wash contaminated skin with mild soap or detergent. Employee should be removed from exposure and given proper medical treatment. Medical tests required under the emergency section of the medical surveillance (WAC 296-155-17327(4)) must be conducted. If the

chemical is swallowed do not induce vomiting but remove by gastric lavage.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-155-17345, filed 2/3/93, effective 3/15/93.]

WAC 296-155-17347 Appendix D to WAC 296-155-173—Sampling and analytical methods for MDA monitoring and measurement procedures. Measurements taken for the purpose of determining employee exposure to MDA are best taken so that the representative average 8-hour exposure may be determined from a single 8-hour sample or two 4-hour samples. Short-time interval samples (or grab samples) may also be used to determine average exposure level if a minimum of five measurements are taken in a random manner over the 8-hour work shift. Random sampling means that any portion of the work shift has the same chance of being sampled as any other. The arithmetic average of all such random samples taken on one work shift is an estimate of an employee's average level of exposure for that work shift. Air samples should be taken in the employee's breathing zone (air that would most nearly represent that inhaled by the employee). There are a number of methods available for monitoring employee exposures to MDA. The method OSHA currently uses is included below. The employer however has the obligation of selecting any monitoring method which meets the accuracy and precision requirements of the standard under her or his unique field conditions. The standard requires that the method of monitoring must have an accuracy, to a 95 percent confidence level, of not less than plus or minus 25 percent for the select PEL.

WISHA methodology.

Sampling procedure.

Apparatus:

Samples are collected by use of a personal sampling pump that can be calibrated within $\pm 5\%$ of the recommended flow rate with the sampling filter in line. Samples are collected on 37 mm Gelman type A/E glass fiber filters treated with sulfuric acid. The filters are prepared by soaking each filter with 0.5 mL of 0.26N H₂SO₄. (0.26 N H₂SO₄ can be prepared by diluting 1.5 mL of 36N H₂SO₄ to 200 mL with deionized water.) The filters are dried in an oven at 100 degrees C. for one hour and then assembled into three-piece 37 mm polystyrene cassettes without backup pads. The front filter is separated from the back filter by a polystyrene spacer. The cassettes are sealed with shrink bands and the ends are plugged with plastic plugs. After sampling, the filters are carefully removed from the cassettes and individually transferred to small vials containing approximately 2 mL deionized water. The vials must be tightly sealed. The water can be added before or after the filters are transferred. The vials must be sealable and capable of holding at least 7 mL of liquid. Small glass scintillation vials with caps containing Teflon liners are recommended.

Reagents:

Deionized water is needed for addition to the vials.

Sampling technique:

Immediately before sampling, remove the plastic plugs from the filter cassettes. Attach the cassette to the sampling pump with flexible tubing and place the cassette in the employee's breathing zone. After sampling, seal the cassettes with plastic plugs until the filters are transferred to the vials containing deionized water. At some convenient time within 10 hours of sampling, transfer the sample filters to vials. Seal the small vials lengthwise. Submit at least one blank filter with each sample set. Blanks should be handled in the same manner as samples, but no air is drawn through them. Record sample volumes (in L of air) for each sample, along with any potential interferences.

Retention efficiency:

A retention efficiency study was performed by drawing 100 L of air (80% relative humidity) at 1 L/min through sample filters that had been spiked with 0.814 micro-g MDA. Instead of using backup pads, blank acid-treated filters were used as backups in each cassette. Upon analysis, the top filters were found to have an average of 91.8% of the spiked amount. There was no MDA found on the bottom filters, so the amount lost was probably due to the slight instability of the MDA salt.

Extraction efficiency:

The average extraction efficiency for six filters spiked at the target concentration is 99.6%. The stability of extracted and derivatized samples was verified by reanalyzing the above six samples the next day using fresh standards. The average extraction efficiency for the reanalyzed samples is 98.7%. Recommended air volume and sampling rate. The recommended air volume is 100 L. The recommended sampling rate is 1 L/min.

Interferences (sampling):

MDI appears to be a positive interference. It was found that when MDI was spiked onto an acid-treated filter, the MDI converted to MDA after air was drawn through it. Suspected interferences should be reported to the laboratory with submitted samples.

Safety precautions (sampling):

Attach the sampling equipment to the employees so that it will not interfere with work performance or safety. Follow all safety procedures that apply to the work area being sampled.

Analytical procedure:

Apparatus:

The following are required for analysis. A GC equipped with an electron capture detector. For this evaluation a Hewlett Packard 5880 Gas Chromatograph equipped with a Nickel 63 High Temperature Electron Capture Detector and a Linearizer was used. A GC column capable of separating the MDA derivative from the solvent and interferences. A 6 ft x 2 mm ID glass column packed with 3% OV-101 coated on 100/120 Gas Chrom Q or a 25 meter DB-1 or DB-5 capillary column is recommended for this evaluation. An electronic integrator or some other suitable means of measuring peak areas or heights. Small resealable vials with Teflon-lined caps capable of holding 4 mL. A dispenser or pipet for toluene capable of delivering 2.9 mL. Pipets (or repipets with plastic or Teflon tips) capable of delivering 1 mL for the sodium hydroxide and buffer solutions. A repipet capable of delivering 25 micro-L HFAA. Syringes

for preparation of standards and injection of standards and samples into a GC. Volumetric flasks and pipets to dilute the pure MDA in preparation of standards. Disposable pipets to transfer the toluene layers after the samples are extracted.

Reagents:

0.5 NaOH prepared from reagent grade NaOH. Toluene, pesticide grade. Burdick and Jackson distilled in glass toluene was used. Heptafluorobutyric acid anhydride (HFAA). HFAA from Pierce Chemical Company was used. pH 7.0 phosphate buffer, prepared from 136 g potassium dihydrogen phosphate and 1 L deionized water. The pH is adjusted to 7.0 with saturated sodium hydroxide solution. 4,4'-methylenedianiline (MDA), reagent grade.

Standard preparation:

Concentrated stock standards are prepared by diluting pure MDA with toluene. Analytical standards are prepared by injecting micro-L amounts of diluted stock standards into vials that contain 2.0 mL toluene. 25 micro-L HFAA are added to each vial and the vials are capped and shaken for 10 seconds. After 10 min, 1 mL of buffer is added to each vial. The vials are recapped and shaken for 10 seconds. After allowing the layers to separate, aliquots of the toluene (upper) layers are removed with a syringe and analyzed by GC. Analytical standard concentrations should bracket sample concentrations. Thus, if samples fall out of the range of prepared standards, additional standards must be prepared to ascertain detector response.

Sample preparation:

The sample filters are received in vials containing deionized water. 1 mL of 0.5N NaOH and 2.0 mL toluene are added to each vial. The vials are recapped and shaken for 10 min. After allowing the layers to separate, approximately 1 mL aliquots of the toluene (upper) layers are transferred to separate vials with clean disposable pipets. The toluene layers are treated and analyzed.

Analysis:

GC conditions.

Zone temperatures: Column—220 degrees C. Injector—235 degrees C. Detector—335 degrees C. Gas flows, N₂ Column—30 mL/min He Purge—Column 0.9 mL/min. (capillary) with 30 mL/min. ArCH₄ (95/5) make up gas Injection volume: 5.0 uL Column: 6 ft x 1/8 in ID glass, 3% OV-101 on 100/120 Gas Chrom Q or 25 Retention time of MDA derivative: 2.5 to 3.5, depending on column and flow. Chromatogram. Peak areas or heights are measured by an integrator or other suitable means. A calibration curve is constructed by plotting response (peak areas or heights) of standard injections versus micro-g of MDA per sample. Sample concentrations must be bracketed by standards.

Interferences (analytical):

Any compound that gives an electron capture detector response and has the same general retention time as the HFAA derivative of MDA is a potential interference. Suspected interferences reported to the laboratory with submitted samples by the industrial hygienist must be considered before samples are derivatized. GC parameters may be changed to possibly circumvent interferences. Retention time on a single column is not considered proof of chemical identity. Analyte identity should be confirmed by GC/MS if possible.

Calculations:

The analyte concentration for samples is obtained from the calibration curve in terms of micro-g MDA per sample. The extraction efficiency is 100%. If any MDA is found on the blank, that amount is subtracted from the sample amounts. The air concentrations are calculated using the following formulae. $\text{micro-}\mu\text{g}/\text{m}^3 = (\text{micro-}\mu\text{g MDA per sample}) / (\text{L of air sampled}) \text{ ppb} = (\text{micro-}\mu\text{g}/\text{m}^3) (24.46)/(198.3) = (\text{micro-}\mu\text{g}/\text{m}^3)(0.1233)$ where 24.46 is the molar volume at 25 degrees C. and 760 mm Hg.

Safety precautions (analytical). Avoid skin contact and inhalation of all chemicals. Restrict the use of all chemicals to a fume hood if possible. Wear safety glasses and a lab coat at all times while in the lab area.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-155-17347, filed 2/3/93, effective 3/15/93.]

WAC 296-155-17349 Appendix E to WAC 296-155-173—Methylenedianiline—Qualitative and quantitative fit testing procedures.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-155-17349, filed 2/3/93, effective 3/15/93.]

WAC 296-155-17351 Appendix E-1—Qualitative protocols.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-155-17351, filed 2/3/93, effective 3/15/93.]

WAC 296-155-17353 Appendix E-1-a—Isoamyl acetate (banana oil) protocol. (1) Odor threshold screening.

(a) Three 1-liter glass jars with metal lids (e.g. Mason or Ball jars) are required.

(b) Odor-free water (e.g., distilled or spring water) at approximately 25 deg. C. shall be used for the solutions.

(c) The isoamyl acetate (IAA) (also known as isopentyl acetate) stock solution is prepared by adding 1 cc of pure IAA to 800 cc of odor-free water in a 1-liter jar and shaking for 30 seconds. This solution shall be prepared new at least weekly.

(d) The screening test shall be conducted in a room separate from the room used for actual fit testing. The two rooms shall be well ventilated so that circulation of the test solution does not occur and cross contaminate the different testing sites.

(e) The odor test solution is prepared in a second jar by placing 0.4 cc of the stock solution into 500 cc of odor-free water using a clean dropper or pipette. Shake for 30 seconds and allow to stand for two to three minutes so that the IAA concentration above the liquid may reach equilibrium. This solution may be used for only one day.

(f) A test blank is prepared in a third jar by adding 500 cc of odor-free water.

(g) The odor test and test blank jars shall be labelled 1 and 2 for jar identification. The following instructions shall be typed on a card and placed on the table in front of the two test jars (i.e., 1 and 2): "The purpose of this test is to determine if you can smell banana oil at a low concentration. The two bottles in front of you contain water. One of these bottles also contains a small amount of banana oil. Be sure the covers are on tight, then shake each bottle for two

seconds. Unscrew the lid of each bottle, one at a time, and sniff at the mouth of the bottle. Indicate to the test conductor which bottle contains banana oil."

(h) The mixtures used in the IAA odor detection test shall be prepared in an area separate from where the test is performed, in order to prevent olfactory fatigue in the subject.

(i) If the test subject is unable to correctly identify the jar containing the odor test solution, the IAA qualitative fit test may not be used.

(j) If the test subject correctly identifies the jar containing the odor test solution, the test subject may proceed to respirator selection and fit testing.

(2) Respirator selection.

(a) The test subject shall be allowed to pick the most comfortable respirator from a selection including respirators of various sizes from different manufacturers. The selection shall include at least three sizes of elastomeric half facepieces, from at least two manufacturers.

(b) The selection process shall be conducted in a room separate from the fit test chamber to prevent odor fatigue. Prior to the selection process, the test subject shall be shown how to put on a respirator, how it should be positioned on the face, how to set strap tension, and how to determine a "comfortable" respirator. A mirror shall be available to assist the subject in evaluating the fit and positioning of the respirator. This instruction may not constitute the subject's formal training on respirator use, as it is only a review.

(c) The test subject should understand that the employee is being asked to select the respirator which provides the most comfortable fit.

(d) The test subject holds each facepiece up to the face and eliminates those which obviously do not give a comfortable fit. Normally, selection will begin with a half-mask and if a comfortable fit cannot be found, the subject will be asked to test the full facepiece respirators. (A small percentage of users will not be able to wear any half-mask.)

(e) The more comfortable facepieces are noted; the most comfortable mask is donned and worn at least five minutes to assess comfort. All donning and adjustments of the facepiece shall be performed by the test subject without assistance from the test conductor or other person. Assistance in assessing comfort can be given by discussing the points in subdivision (f) below. If the test subject is not familiar with using a particular respirator, the test subject shall be directed to don the mask several times and to adjust the straps each time to become adept at setting proper tension on the straps.

(f) Assessment of comfort shall include reviewing the following points with the test subject and allowing the test subject adequate time to determine the comfort of the respirator after donning:

- (i) Positioning of mask on nose;
- (ii) Room for eye protection;
- (iii) Room to talk;
- (iv) Positioning mask on face and cheeks.

(g) The following criteria shall be used to help determine the adequacy of the respirator fit:

- (i) Chin properly placed;
- (ii) Strap tension;
- (iii) Fit across nose bridge;
- (iv) Distance from nose to chin;
- (v) Tendency to slip;

(vi) Self-observation in mirror.

(h) The test subject shall perform the conventional negative-pressure or positive-pressure fit checks (e.g., see ANSI Z88.2-1980A7). Before beginning the negative-pressure or positive-pressure test, the subject shall be told to "seat" the mask by rapidly moving the head from side to side and up and down, while taking a few deep breaths.

(i) The test subject is now ready for fit testing.

(j) After passing the fit test, the test subject shall be questioned again regarding the comfort of the respirator. If the respirator has become uncomfortable, another model of respirator shall be tried.

(k) The employee shall be given the opportunity to select a different facepiece and to be retested if the chosen facepiece becomes increasingly uncomfortable at any time.

(3) Fit test.

(a) The fit test chamber shall be similar to a clear 55 gallon drum liner suspended inverted over a 2-foot diameter frame, so that the top of chamber is about 6 inches above the test subject's head. The inside top center of the chamber shall have a small hook attached.

(b) Each respirator used for the fitting and fit testing shall be equipped with organic vapor cartridges or offer protection against organic vapors. The cartridges or canisters shall be replaced as necessary to maintain the effectiveness of the respirator.

(c) After selecting, donning, and properly adjusting a respirator, the test subject shall wear it to the fit testing room. This room shall be separate from the room used for odor threshold screening and respirator selection, and shall be well ventilated, as by an exhaust fan or lab hood, to prevent general room contamination.

(d) A copy of the following test exercises and Rainbow Passage shall be taped to the inside of the test chamber:

(e) Test exercises.

(i) Breathe normally.

(ii) Breathe deeply. Be certain breaths are deep and regular.

(iii) Turn head all the way from one side to the other. Inhale on each side. Be certain movement is complete. Do not bump the respirator against the shoulders.

(iv) Nod head up and down. Inhale when head is in the full up position (looking toward ceiling). Be certain motions are complete and made about every second. Do not bump the respirator on the chest.

(v) Talking. Talk aloud and slowly for several minutes. The following paragraph is called the Rainbow Passage. Reading it aloud will result in a wide range of facial movements, and thus be useful to satisfy this requirement. Alternative passages which serve the same purpose may also be used.

Rainbow Passage:

When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond reach, his friends say he is looking for the pot of gold at the end of the rainbow.

(vi) Jog in place.

(vii) Breathe normally.

(f) Each test subject shall wear the respirator for at least 10 minutes before starting the fit test.

(g) Upon entering the test chamber, the test subject shall be given a 6-inch by 5-inch piece of paper towel or other porous absorbent single ply material, folded in half and wetted with three-quarters of one cc of pure IAA. The test subject shall hang the wet towel on the hook at the top of the chamber.

(h) Allow two minutes for the IAA test concentration to be reached before starting the fit test exercises.

(i) Each exercise described in subdivision (e) of this subsection shall be performed for at least one minute.

(j) If at any time during the test, the subject detects the banana-like odor of IAA, the test has failed. The subject shall quickly exit from the test chamber and leave the test area to avoid olfactory fatigue.

(k) If the test is failed, the subject shall return to the selection room and remove the respirator, repeat the odor sensitivity test, select and put on another respirator, return to the test chamber, and again begin the procedure described in subdivisions (d) through (j) of this subsection. The process continues until a respirator that fits well has been found. Should the odor sensitivity test be failed, the subject shall wait about 5 minutes before retesting. Odor sensitivity will usually have returned by this time.

(l) If a person cannot pass the fit test described above wearing a half-mask respirator from the available selection, full facepiece models must be used.

(m) When a respirator is found that passes the test, the subject must break the face seal and take a breath before exiting the chamber. This is to assure that the reason the test subject is not smelling the IAA is the good fit of the respirator facepiece seal and not olfactory fatigue.

(n) When the test subject leaves the chamber, the subject shall remove the saturated towel and return it to the person conducting the test. To keep the area from becoming contaminated, the used towels shall be kept in a self-sealing bag so there is no significant IAA concentration buildup in the test chamber during subsequent tests.

(o) Persons who have successfully passed this fit test with a half-mask respirator may be assigned the use of the test respirator in atmospheres with up to 10 times the PEL. In atmospheres greater than 10 times, and less than 50 times the PEL (up to 50 ppm), the subject must pass the IAA test using a full face negative-pressure respirator. (The concentration of the IAA inside the test chamber must be increased by five times for QLFT of the full facepiece.)

(p) The test shall not be conducted if there is any hair growth between the skin and the facepiece sealing surface.

(q) If hair growth or apparel interfere with a satisfactory fit, then they shall be altered or removed so as to eliminate interference and allow a satisfactory fit. If a satisfactory fit is still not attained, the test subject must use a positive-pressure respirator such as a powered air-purifying respirator, supplied air respirator, or self-contained breathing apparatus.

(r) If a test subject exhibits difficulty in breathing during the tests, she or he shall be referred to a physician trained in respiratory diseases or pulmonary medicine to determine whether the test subject can wear a respirator while performing her or his duties.

(s) Qualitative fit testing shall be repeated at least every 12 months.

(t) In addition, because the sealing of the respirator may be affected, qualitative fit testing shall be repeated immediately when the test subject has a:

(i) Weight change of 20 pounds or more;

(ii) Significant facial scarring in the area of the facepiece seal;

(iii) Significant dental changes; i.e., multiple extractions without prosthesis, or acquiring dentures;

(iv) Reconstructive or cosmetic surgery; or

(v) Any other condition that may interfere with facepiece sealing.

(4) Recordkeeping. A summary of all test results shall be maintained by the employer for 3 years. The summary shall include:

(a) Name of test subject.

(b) Date of testing.

(c) Name of the test conductor.

(d) Respirators selected (indicate manufacturer, model, size, and approval number).

(e) Testing agent.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-155-17353, filed 2/3/93, effective 3/15/93.]

WAC 296-155-17355 Appendix E-1-b—Saccharin solution aerosol protocol. (1) Respirator selection. Respirators shall be selected as described in WAC 296-155-17353(2) (respirator selection), except that each respirator shall be equipped with a particulate filter.

(2) Taste threshold screening.

(a) An enclosure placed over the head and shoulders shall be used for threshold screening (to determine if the individual can taste saccharin) and for fit testing. The enclosure shall be approximately 12 inches in diameter by 14 inches tall with at least the front clear to allow free movement of the head when a respirator is worn.

(b) The test enclosure shall have a three-quarter inch hole in front of the test subject's nose and mouth area to accommodate the nebulizer nozzle.

(c) The entire screening and testing procedure shall be explained to the test subject prior to conducting the screening test.

(d) During the threshold screening test, the test subject shall don the test enclosure and breathe with open mouth with tongue extended.

(e) Using a DeVilbiss Model 40 inhalation medication nebulizer or equivalent, the test conductor shall spray the threshold check solution into the enclosure. This nebulizer shall be clearly marked to distinguish it from the fit test solution nebulizer.

(f) The threshold check solution consists of 0.83 grams of sodium saccharin, USP in water. It can be prepared by putting 1 cc of the test solution (see C 7 below) in 100 cc of water.

(g) To produce the aerosol, the nebulizer bulb is firmly squeezed so that it collapses completely, then is released and allowed to fully expand.

(h) Ten squeezes of the nebulizer bulb are repeated rapidly and then the test subject is asked whether the saccharin can be tasted.

(i) If the first response is negative, ten more squeezes of the nebulizer bulb are repeated rapidly and the test subject is again asked whether the saccharin can be tasted.

(j) If the second response is negative ten more squeezes are repeated rapidly and the test subject is again asked whether the saccharin can be tasted.

(k) The test conductor will take note of the number of squeezes required to elicit a taste response.

(l) If the saccharin is not tasted after 30 squeezes (Step 10), the saccharin fit test cannot be performed on the test subject.

(m) If a taste response is elicited, the test subject shall be asked to take note of the taste for reference in the fit test.

(n) Correct use of the nebulizer means that approximately 1 cc of liquid is used at a time in the nebulizer body.

(o) The nebulizer shall be thoroughly rinsed in water, shaken dry, and refilled at least every four hours.

(3) Fit test.

(a) The test subject may not eat, drink (except plain water), or chew gum for 15 minutes before the test.

(b) The test subject shall don and adjust the respirator without assistance from any person.

(c) The fit test uses the same enclosure described in IIB above.

(d) Each test subject shall wear the respirator for at least 10 minutes before starting the fit test.

(i) This would be an appropriate time to talk with the test subject; to explain the fit test, the importance of cooperation, and the purpose for the head exercises; or to demonstrate some of the exercises.

(ii) The test subject shall perform the conventional negative-pressure or positive-pressure fit tests (see ANZI [ANSI] Z88.2 1980 A7).

(e) The test subject shall enter the enclosure while wearing the respirator selected in section IB above. This respirator shall be properly adjusted and equipped with a particulate filter.

(f) A second DeVilbiss Model 40 inhalation medication nebulizer is used to spray the fit test solution into the enclosure. This nebulizer shall be clearly marked to distinguish it from the screening test solution nebulizer.

(g) The fit test solution is prepared by adding 83 grams of sodium saccharin to 100 cc of warm water.

(h) As before, the test subject shall breathe with mouth open and tongue extended.

(i) The nebulizer is inserted into the hole in the front of the enclosure and the fit test solution is sprayed into the enclosure using the same technique as for the taste threshold screening and the same number of squeezes required to elicit a taste response in the screening. (See B8 through B10 above.)

(j) After generation of the aerosol read the following instructions to the test subject. The test subject shall perform the exercises for one minute each.

(i) Breathe normally.

(ii) Breathe deeply. Be certain breaths are deep and regular.

(iii) Turn head all the way from one side to the other. Be certain movement is complete. Inhale on each side. Do not bump the respirator against the shoulders.

(iv) Nod head up and down. Be certain motions are complete. Inhale when head is in the full up position (when

looking toward the ceiling). Do not bump the respirator on the chest.

(v) Talk. Talk aloud and slowly. The following paragraph is called the Rainbow Passage. Reading it will result in a wide range of facial movements, and thus be useful to satisfy this requirement.

Rainbow Passage:

When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond his reach, his friends say he is looking for the pot of gold at the end of the rainbow.

(vi) Jog in place.

(vii) Breathe normally.

(k) At the beginning of each exercise, the aerosol concentration shall be replenished using one-half the number of squeezes as initially described in C9.

(l) The test subject shall indicate to the test conductor if at any time during the fit test the taste of saccharin is detected.

(m) If the saccharin is detected the fit is deemed unsatisfactory and a different respirator shall be tried.

(n) Successful completion of the test protocol shall allow the use of the half-mask tested respirator in contaminated atmospheres up to 10 times the PEL of MDA. In other words this protocol may not be used to assign protection factors no higher than ten.

(o) The test shall not be conducted if there is any hair growth between the skin and the facepiece sealing surface.

(p) If hair growth or apparel interfere with a satisfactory fit, then they shall be altered or removed so as to eliminate interference and allow a satisfactory fit. If a satisfactory fit is still not attained, the test subject must use a positive-pressure respirator such as powered air-purifying respirators, supplied-air respirator, or self-contained breathing apparatus.

(q) If a test subject exhibits difficulty in breathing during the tests, she or he shall be referred to a physician trained in respirator diseases or pulmonary medicine to determine whether the test subject can wear a respirator while performing her or his duties.

(r) Qualitative fit testing shall be repeated at least every 12 months.

(s) In addition, because the sealing of the respirator may be affected, qualitative fit testing shall be repeated immediately when the test subject has a:

(i) Weight change of 20 pounds or more;

(ii) Significant facial scarring in the area of the facepiece seal;

(iii) Significant dental changes; i.e., multiple extractions without prosthesis, or acquiring dentures;

(iv) Reconstructive or cosmetic surgery; or

(v) Any other condition that may interfere with facepiece sealing.

(4) Recordkeeping. A summary of all test results shall be maintained by the employer for 3 years. The summary shall include:

(a) Name of test subject.

(b) Date of testing.

- (c) Name of test conductor.
- (d) Respirators selected (indicate manufacturer, model, size, and approval number).
- (e) Testing agent.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-155-17355, filed 2/3/93, effective 3/15/93.]

WAC 296-155-17357 Appendix E-1-c—Irritant fume protocol. (1) Respirator selection. Respirators shall be selected as described in section IB above, except that each respirator shall be equipped with a combination of high-efficiency and acid-gas cartridges.

(2) Fit test.

(a) The test subject shall be allowed to smell a weak concentration of the irritant smoke to familiarize the subject with the characteristic odor.

(b) The test subject shall properly don the respirator selected as above, and wear it for at least 10 minutes before starting the fit test.

(c) The test conductor shall review this protocol with the test subject before testing.

(d) The test subject shall perform the conventional positive-pressure and negative-pressure fit checks (see ANSI Z88.2 1980). Failure of either check shall be cause to select an alternate respirator.

(e) Break both ends of a ventilation smoke tube containing stannic oxychloride, such as the MSA part #5645, or equivalent. Attach a short length of tubing to one end of the smoke tube. Attach the other end of the smoke tube to a low-pressure air pump set to deliver 200 milliliters per minute.

(f) Advise the test subject that the smoke can be irritating to the eyes and instruct the subject to keep the eyes closed while the test is performed.

(g) The test conductor shall direct the stream of irritant smoke from the tube towards the face seal area of the test subject. The person conducting the test shall begin with the tube at least 12 inches from the facepiece and gradually move to within one inch, moving around the whole perimeter of the mask.

(h) The test subject shall be instructed to do the following exercises while the respirator is being challenged by the smoke. Each exercise shall be performed for one minute.

(i) Breathe normally.

(ii) Breathe deeply. Be certain breaths are deep and regular.

(iii) Turn head all the way from one side to the other. Be certain movement is complete. Inhale on each side. Do not bump the respirator against the shoulders.

(iv) Nod head up and down. Be certain motions are complete and made every second. Inhale when head is in the full up position (looking toward ceiling). Do not bump the respirator against the chest.

(v) Talking. Talk aloud and slowly for several minutes. The following paragraph is called the Rainbow Passage. Reading it will result in a wide range of facial movements, and thus be useful to satisfy this requirement. Alternative passages which serve the same purpose may also be used. Rainbow Passage:

When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of

white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond his reach, his friends say he is looking for the pot of gold at the end of the rainbow.

(vi) Jogging in place.

(vii) Breathe normally.

(i) The test subject shall indicate to the test conductor if the irritant smoke is detected. If smoke is detected, the test conductor shall stop the test. In this case, the tested respirator is rejected and another respirator shall be selected.

(j) Each test subject passing the smoke test (i.e., without detecting the smoke) shall be given a sensitivity check of smoke from the same tube to determine if the test subject reacts to the smoke. Failure to evoke a response shall void the fit test.

(k) Steps (2)(d), (i), and (j) of this fit test protocol shall be performed in a location with exhaust ventilation sufficient to prevent general contamination of the testing area by the test agents.

(l) Respirators successfully tested by the protocol may be used in contaminated atmospheres up to ten times the PEL of MDA.

(m) The test shall not be conducted if there is any hair growth between the skin and the facepiece sealing surface.

(n) If hair growth or apparel interfere with a satisfactory fit, then they shall be altered or removed so as to eliminate interference and allow a satisfactory fit. If a satisfactory fit is still not attained, the test subject must use a positive-pressure respirator such as powered air-purifying respirators, supplied-air respirator, or self-contained breathing apparatus.

(o) If a test subject exhibits difficulty in breathing during the tests, she or he shall be referred to a physician trained in respirator diseases or pulmonary medicine to determine whether the test subject can wear a respirator while performing her or his duties.

(p) Qualitative fit testing shall be repeated at least every 12 months.

(q) In addition, because the sealing of the respirator may be affected, qualitative fit testing shall be repeated immediately when the test subject has a:

(i) Weight change of 20 pounds or more;

(ii) Significant facial scarring in the area of the facepiece seal;

(iii) Significant dental changes; i.e., multiple extractions without prosthesis, or acquiring dentures;

(iv) Reconstructive or cosmetic surgery; or

(v) Any other condition that may interfere with facepiece sealing.

(3) Recordkeeping. A summary of all test results shall be maintained by the employer for 3 years. The summary shall include:

(a) Name of test subject.

(b) Date of testing.

(c) Name of test conductor.

(d) Respirators selected (indicate manufacturer, model, size, and approval number).

(e) Testing agent.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-155-17357, filed 2/3/93, effective 3/15/93.]

WAC 296-155-17359 Appendix E-2—Quantitative fit test procedures. (1) General.

(a) The method applies to the negative-pressure nonpowered air-purifying respirators only.

(b) The employer shall assign an individual (with help as needed) who shall assume the full responsibility for implementing the respirator quantitative fit test program.

(2) Definition.

(a) "Quantitative fit test" means the measurement of the effectiveness of a respirator seal in excluding the ambient atmosphere. The test is performed by dividing the measured concentration of challenge agent in a test chamber by the measured concentration of the challenge agent inside the respirator facepiece when the normal air-purifying element has been replaced by an essentially perfect purifying element.

(b) "Challenge agent" means the air contaminant introduced into a test chamber so that its concentration inside and outside the respirator may be compared.

(c) "Test subject" means the person wearing the respirator for quantitative fit testing.

(d) "Normal standing position" means standing erect and straight with arms down along the sides and looking straight ahead.

(e) "Fit factor" means the ratio of challenge agent concentration outside with respect to the inside of a respirator inlet covering (facepiece or enclosure).

(3) Apparatus.

(a) Instrumentation. Corn oil, sodium chloride, or other appropriate aerosol generation, dilution, and measurement systems shall be used for quantitative fit test.

(b) Test chamber. The test chamber shall be large enough to permit all test subjects to freely perform all required exercises without distributing the challenge agent concentration or the measurement apparatus. The test chamber shall be equipped and constructed so that the challenge agent is effectively isolated from the ambient air yet uniform in concentration throughout the chamber.

(c) When testing air-purifying respirators, the normal filter or cartridge element shall be replaced with a high-efficiency particulate filter supplied by the same manufacturer.

(d) The sampling instrument shall be selected so that a strip chart record may be made of the test showing the rise and fall of challenge agent concentration with each inspiration and expiration at fit factors of at least 2,000.

(e) The combination of substitute air-purifying elements (if any), challenge agent, and challenge agent concentration in the test chamber shall be such that the test subject is not exposed in excess of PEL to the challenge agent at any time during the testing process.

(f) The sampling port on the test specimen respirator shall be placed and constructed so that there is no detectable leak around the port, a free air flow is allowed into the sampling line at all times, and so there is no interference with the fit or performance of the respirator.

(g) The test chamber and test set-up shall permit the person administering the test to observe one test subject inside the chamber during the test.

(h) The equipment generating the challenge atmosphere shall maintain the concentration of challenge agent constant within a 10 percent variation for the duration of the test.

(i) The time lag (interval between an event and its being recorded on the strip chart) of the instrumentation may not exceed 2 seconds.

(j) The tubing for the test chamber atmosphere and for the respirator sampling port shall be the same diameter, length, and material. It shall be kept as short as possible. The smallest diameter tubing recommended by the manufacturer shall be used.

(k) The exhaust flow from the test chamber shall pass through a high-efficiency filter before release to the room.

(l) When sodium chloride aerosol is used, the relative humidity inside the test chamber shall not exceed 50 percent.

(4) Procedural requirements.

(a) The fitting of half-mask respirators should be started with those having multiple sizes and a variety of interchangeable cartridges and canisters such as the MSA Comfr II-M, Norton M, Survivair M A- O M, or Scott-M. Use either of the tests outlined below to assure that the facepiece is properly adjusted.

(i) Positive-pressure test. With the exhaust port(s) blocked the negative pressure of slight inhalation should remain constant for several seconds.

(ii) Negative-pressure test. With the intake port(s) blocked the negative pressure slight inhalation should remain constant for several seconds.

(b) After a facepiece is adjusted, the test subject shall wear the facepiece for at least 5 minutes before conducting a qualitative test by using either of the methods described below and using the exercise regime described in subsection (5)(a) through (e) of this section.

(i) Isoamyl acetate test. When using organic vapor cartridges, the test subject who can smell the odor should be unable to detect the odor of isoamyl acetate squirted into the air near the most vulnerable portions of the facepiece seal. In a location which is separated from the test area, the test subject shall be instructed to close her/his eyes during the test period. A combination cartridge or canister with organic vapor and high-efficiency filters shall be used when available for the particular mask being tested. The test subject shall be given an opportunity to smell the odor of isoamyl acetate before the test is conducted.

(ii) Irritant fume test. When using high-efficiency filters, the test subject should be unable to detect the odor of irritant fume (stannic chloride or titanium tetrachloride ventilation smoke tubes) squirted into the air near the most vulnerable portions of the facepiece seal. The test subject shall be instructed to close her/his eyes during the test period.

(c) The test subject may enter the quantitative testing chamber only if she or he has obtained a satisfactory fit as stated in subdivision (b) of this subsection.

(d) Before the subject enters the test chamber, a reasonably stable challenge agent concentration shall be measured in the test chamber.

(e) Immediately after the subject enters the test chamber, the challenge agent concentration inside the respirator shall be measured to ensure that the peak penetration does not exceed 5 percent for a half-mask and 1 percent for a full facepiece.

(f) A stable challenge agent concentration shall be obtained prior to the actual start of testing.

(g) Respirator restraining straps may not be overtightened for testing. The straps shall be adjusted by the wearer to give a reasonably comfortable fit typical of normal use.

(5) Exercise regime. Prior to entering the test chamber, the test subject shall be given complete instructions as to her/his part in the test procedures. The test subject shall perform the following exercises, in the order given, for each independent test.

(a) Normal breathing (NB). In the normal standing position, without talking, the subject shall breathe normally for at least one minute.

(b) Deep breathing (DB). In the normal standing position the subject shall do deep breathing for at least one minute pausing so as not to hyperventilate.

(c) Turning head side to side (SS). Standing in place the subject shall slowly turn her or his head from side to side between the extreme positions to each side. The head shall be held at each extreme position for at least 5 seconds. Perform for at least five complete cycles.

(d) Moving head up and down (UD). Standing in place, the subject shall slowly move her or his head up and down between the extreme position straight up and the extreme position straight down. The head shall be held at each extreme position for at least 5 seconds. Perform for at least five complete cycles.

(e) Reading (R). The subject shall read out slowly and loud so as to be heard clearly by the test conductor or monitor. The test subject shall read the "Rainbow Passage" at the end of this section.

(f) Grimace (G). The test subject shall grimace, smile, frown, and generally contort the face using the facial muscles. Continue for at least 15 seconds.

(g) Bend over and touch toes (B). The test subject shall bend at the waist and touch toes and return to upright position. Repeat for at least one minute.

(h) Jogging in place (J). The test subject shall jog in place for at least one minute.

(i) Normal breathing (NB). In the normal standing position, without talking, the subject shall breathe normally for at least one minute.

Rainbow Passage:

When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond reach, his friends say he is looking for the pot of gold at the end of the rainbow.

(6) Termination of tests. The test shall be terminated whenever any single peak penetration exceeds 5 percent for half-masks and 1 percent for full facepieces. The test subject may be refitted and retested. If two of the three required tests are terminated, the fit shall be deemed inadequate.

(7) Calculation of fit factors.

(a) The fit factor determined by the quantitative fit test equals the average concentration inside the respirator.

(b) The average test chamber concentration is the arithmetic average of the test chamber concentration at the beginning and at the end of the test.

(c) The average peak concentration of the challenge agent inside the respirator shall be the arithmetic average peak concentrations for each of the nine exercises of the test which are computed as the arithmetic average of the peak concentrations found for each breath during the exercise.

(d) The average peak concentration for an exercise may be determined graphically if there is not a great variation in the peak concentrations during a single exercise.

(8) Interpretation of test results. The fit factor measured by the quantitative fit testing shall be the lowest of the three protection factors resulting from three independent tests.

(9) Other requirements.

(a) The test subject shall not be permitted to wear a half-mask or full facepiece if the minimum fit factor of 250 or 1,250, respectively, cannot be obtained. If hair growth or apparel interfere with a satisfactory fit, then they shall be altered or removed so as to eliminate interference and allow a satisfactory fit. If a satisfactory fit is still not attained, the test subject must use a positive-pressure respirator such as powered air-purifying respirators, supplied-air respirator, or self-contained breathing apparatus.

(b) The test shall not be conducted if there is any hair growth between the skin and the facepiece sealing surface.

(c) If a test subject exhibits difficulty in breathing during the tests, she or he shall be referred to a physician to determine whether the test subject can wear a respirator while performing her or his duties.

(d) The test subject shall be given the opportunity to wear the assigned respirator for one week. If the respirator does not provide a satisfactory fit during actual use, the test subject may request another QNFT which shall be performed immediately.

(e) A respirator fit factor card shall be issued to the subject with the following information:

(i) Name.

(ii) Date of fit test.

(iii) Protection factors obtained through each manufacturer, model and approval number of respirator tested.

(iv) Name and signature of the person that conducted the test.

(f) Filters used for qualitative or quantitative fit testing shall be replaced weekly, whenever increased breathing resistance is encountered, or when the test agent has altered the integrity of the filter media. Organic vapor cartridges/canisters shall be replaced daily or sooner if there is any indication of breakthrough by the test agent.

(10) Retesting. In addition, because the sealing of the respirator may be affected, quantitative fit testing shall be repeated immediately when the test subject has a:

(a) Weight change of 20 pounds or more;

(b) Significant facial scarring in the area of the facepiece seal;

(c) Significant dental changes; i.e., multiple extractions without prosthesis, or acquiring dentures;

(d) Reconstructive or cosmetic surgery; or

(e) Any other condition that may interfere with facepiece sealing.

(11) Recordkeeping.

(a) A summary of all test results shall be maintained for three years. The summary shall include:

(i) Name of test subject.

(ii) Date of testing.

(iii) Name of the test conductor.

(iv) Fit factors obtained from every respirator tested (indicate manufacturer, model, size, and approval number).

(b) A copy of all test data including the strip chart and results shall be kept for at least five years.

[Statutory Authority: Chapter 49.17 RCW. 93-04-111 (Order 92-15), § 296-155-17359, filed 2/3/93, effective 3/15/93.]

WAC 296-155-174 Cadmium. (1) Scope. This standard applies to all occupational exposures to cadmium and cadmium compounds, in all forms, in all construction work where an employee may potentially be exposed to cadmium. Construction work is defined as work involving construction, alteration, and/or repair, including but not limited to the following:

(a) Wrecking, demolition, or salvage of structures where cadmium or materials containing cadmium are present;

(b) Use of cadmium containing-paints and cutting, brazing, burning, grinding, or welding on surfaces that were painted with cadmium-containing paints;

(c) Construction, alteration, repair, maintenance, or renovation of structures, substrates, or portions thereof, that contain cadmium, or materials containing cadmium;

(d) Cadmium welding; cutting and welding cadmium-plated steel; brazing or welding with cadmium alloys;

(e) Installation of products containing cadmium;

(f) Electrical grounding with cadmium-welding, or electrical work using cadmium-coated conduit;

(g) Maintaining or retrofitting cadmium-coated equipment;

(h) Cadmium contamination/emergency cleanup; and

(i) Transportation, disposal, storage, or containment of cadmium or materials containing cadmium on the site or location at which construction activities are performed.

(2) Definitions.

(a) Action level (AL) is defined as an airborne concentration of cadmium of 2.5 micrograms per cubic meter of air ($2.5 \mu\text{g}/\text{m}^3$), calculated as an 8-hour time-weighted average (TWA).

(b) Authorized person means any person authorized by the employer and required by work duties to be present in regulated areas or any person authorized by WISHA or regulations issued under it to be in regulated areas.

(c) Competent person, in accordance with WAC 296-155-012(4), means a person designated by the employer to act on the employer's behalf who is capable of identifying existing and potential cadmium hazards in the workplace and the proper methods to control them in order to protect workers, and has the authority necessary to take prompt corrective measures to eliminate or control such hazards. The duties of a competent person include at least the following: Determining prior to the performance of work whether cadmium is present in the workplace; establishing, where necessary, regulated areas and assuring that access to and from those areas is limited to authorized employees; assuring the adequacy of any employee exposure monitoring required by this standard; assuring that all employees exposed to air cadmium levels above the PEL wear appropriate personal protective equipment and are trained in the use of appropriate methods of exposure control; assuring that proper hygiene facilities are provided and that workers are

trained to use those facilities; and assuring that the engineering controls required by this standard are implemented, maintained in proper operating condition, and functioning properly.

(d) Director means the director of the department of labor and industries or authorized representative.

(e) Employee exposure and similar language referring to the air cadmium level to which an employee is exposed means the exposure to airborne cadmium that would occur if the employee were not using respiratory protective equipment.

(f) Final medical determination is the written medical opinion of the employee's health status by the examining physician under subsection (12)(c) through (l) of this section or, if multiple physician review under subsection (12)(m) of this section or the alternative physician determination under subsection (12)(n) of this section is invoked, it is the final, written medical finding, recommendation or determination that emerges from that process.

(g) High-efficiency particulate air (HEPA) filter means a filter capable of trapping and retaining at least 99.97 percent of mono-dispersed particles of 0.3 micrometers in diameter.

(h) Regulated area means an area demarcated by the employer where an employee's exposure to airborne concentrations of cadmium exceeds, or can reasonably be expected to exceed the permissible exposure limit (PEL).

(i) This section means this cadmium standard.

(3) Permissible exposure limit (PEL). The employer shall assure that no employee is exposed to an airborne concentration of cadmium in excess of five micrograms per cubic meter of air ($5 \mu\text{g}/\text{m}^3$), calculated as an 8-hour time-weighted average exposure (TWA).

(4) Exposure monitoring

(a) General.

(i) Prior to the performance of any construction work where employees may be potentially exposed to cadmium, the employer shall establish the applicability of this standard by determining whether cadmium is present in the workplace and whether there is the possibility that employee exposures will be at or above the action level. The employer shall designate a competent person who shall make this determination. Investigation and material testing techniques shall be used, as appropriate, in the determination. Investigation shall include a review of relevant plans, past reports, material safety data sheets, and other available records, and consultations with the property owner and discussions with appropriate individuals and agencies.

(ii) Where cadmium has been determined to be present in the workplace, and it has been determined that there is a possibility the employee's exposure will be at or above the action level, the competent person shall identify employees potentially exposed to cadmium at or above the action level.

(iii) Determinations of employee exposure shall be made from breathing-zone air samples that reflect the monitored employee's regular, daily 8-hour TWA exposure to cadmium.

(iv) Eight-hour TWA exposures shall be determined for each employee on the basis of one or more personal breathing-zone air samples reflecting full shift exposure on each shift, for each job classification, in each work area. Where several employees perform the same job tasks, in the same

job classification, on the same shift, in the same work area, and the length, duration, and level of cadmium exposures are similar, an employer may sample a representative fraction of the employees instead of all employees in order to meet this requirement. In representative sampling, the employer shall sample the employee(s) expected to have the highest cadmium exposures.

(b) Specific.

(i) Initial monitoring. Except as provided for in (b)(iii) of this subsection, where a determination conducted under (a)(i) of this subsection shows the possibility of employee exposure to cadmium at or above the action level, the employer shall conduct exposure monitoring as soon as practicable that is representative of the exposure for each employee in the workplace who is or may be exposed to cadmium at or above the action level.

(ii) In addition, if the employee periodically performs tasks that may expose the employee to a higher concentration of airborne cadmium, the employee shall be monitored while performing those tasks.

(iii) Where the employer has objective data, as defined in subsection (14)(b) of this section, demonstrating that employee exposure to cadmium will not exceed airborne concentrations at or above the action level under the expected conditions of processing, use, or handling, the employer may rely upon such data instead of implementing initial monitoring.

(iv) Where a determination conducted under (a) or (b) of this subsection is made that a potentially exposed employee is not exposed to airborne concentrations of cadmium at or above the action level, the employer shall make a written record of such determination. The record shall include at least the monitoring data developed under (b)(i) through (iii) of this subsection, where applicable, and shall also include the date of determination, and the name and Social Security number of each employee.

(c) Monitoring frequency (periodic monitoring).

(i) If the initial monitoring or periodic monitoring reveals employee exposures to be at or above the action level, the employer shall monitor at a frequency and pattern needed to assure that the monitoring results reflect with reasonable accuracy the employee's typical exposure levels, given the variability in the tasks performed, work practices, and environmental conditions on the job site, and to assure the adequacy of respiratory selection and the effectiveness of engineering and work practice controls.

(ii) If the initial monitoring or the periodic monitoring indicates that employee exposures are below the action level and that result is confirmed by the results of another monitoring taken at least seven days later, the employer may discontinue the monitoring for those employees whose exposures are represented by such monitoring.

(d) Additional monitoring. The employer also shall institute the exposure monitoring required under (b)(i) and (c) of this subsection whenever there has been a change in the raw materials, equipment, personnel, work practices, or finished products that may result in additional employees being exposed to cadmium at or above the action level or in employees already exposed to cadmium at or above the action level being exposed above the PEL, or whenever the employer or competent person has any reason to suspect that any other change might result in such further exposure.

(e) Employee notification of monitoring results.

(i) No later than five working days after the receipt of the results of any monitoring performed under this section, the employer shall notify each affected employee individually in writing of the results. In addition, within the same time period, the employer shall post the results of the exposure monitoring in an appropriate location that is accessible to all affected employees.

(ii) Wherever monitoring results indicate that employee exposure exceeds the PEL, the employer shall include in the written notice a statement that the PEL has been exceeded and a description of the corrective action being taken by the employer to reduce employee exposure to or below the PEL.

(f) Accuracy of measurement. The employer shall use a method of monitoring and analysis that has an accuracy of not less than plus or minus 25 percent ($\pm 25\%$), with a confidence level of 95 percent, for airborne concentrations of cadmium at or above the action level and the permissible exposure limit.

(5) Regulated areas.

(a) Establishment. The employer shall establish a regulated area wherever an employee's exposure to airborne concentrations of cadmium is, or can reasonably be expected to be in excess of the permissible exposure limit (PEL).

(b) Demarcation. Regulated areas shall be demarcated from the rest of the workplace in any manner that adequately establishes and alerts employees of the boundaries of the regulated area, including employees who are or may be incidentally in the regulated areas, and that protects persons outside the area from exposure to airborne concentrations of cadmium in excess of the PEL.

(c) Access. Access to regulated areas shall be limited to authorized persons.

(d) Provision of respirators. Each person entering a regulated area shall be supplied with and required to use a respirator, selected in accordance with subsection (7)(b) of this section.

(e) Prohibited activities. The employer shall assure that employees do not eat, drink, smoke, chew tobacco or gum, or apply cosmetics in regulated areas, or carry the products associated with any of these activities into regulated areas or store such products in those areas.

(6) Methods of compliance.

(a) Compliance hierarchy.

(i) Except as specified in (a)(ii) of this subsection, the employer shall implement engineering and work practice controls to reduce and maintain employee exposure to cadmium at or below the PEL, except to the extent that the employer can demonstrate that such controls are not feasible.

(ii) The requirement to implement engineering controls to achieve the PEL does not apply where the employer demonstrates the following:

(A) The employee is only intermittently exposed; and

(B) The employee is not exposed above the PEL on 30 or more days per year (12 consecutive months).

(iii) Wherever engineering and work practice controls are not sufficient to reduce employee exposure to or below the PEL, the employer nonetheless shall implement such controls to reduce exposures to the lowest levels achievable. The employer shall supplement such controls with respiratory protection that complies with the requirements of subsection (7) of this section and the PEL.

(iv) The employer shall not use employee rotation as a method of compliance.

(b) Specific operations.

(i) Abrasive blasting. Abrasive blasting on cadmium or cadmium-containing materials shall be conducted in a manner that will provide adequate protection.

(ii) Heating cadmium and cadmium-containing materials. Welding, cutting, and other forms of heating of cadmium or cadmium-containing materials shall be conducted in accordance with the requirements of WAC 296-155-415 and 296-155-420, where applicable.

(c) Prohibitions.

(i) High speed abrasive disc saws and similar abrasive power equipment shall not be used for work on cadmium or cadmium-containing materials unless they are equipped with appropriate engineering controls to minimize emissions, if the exposure levels are above the PEL.

(ii) Materials containing cadmium shall not be applied by spray methods, if exposures are above the PEL, unless employees are protected with supplied-air respirators with full facepiece, hood, helmet, suit, operated in positive pressure mode and measures are instituted to limit overspray and prevent contamination of adjacent areas.

(d) Mechanical ventilation.

(i) When ventilation is used to control exposure, measurements that demonstrate the effectiveness of the system in controlling exposure, such as capture velocity, duct velocity, or static pressure shall be made as necessary to maintain its effectiveness.

(ii) Measurements of the system's effectiveness in controlling exposure shall be made as necessary within five working days of any change in production, process, or control that might result in a significant increase in employee exposure to cadmium.

(iii) Recirculation of air. If air from exhaust ventilation is recirculated into the workplace, the system shall have a high efficiency filter and be monitored to assure effectiveness.

(iv) Procedures shall be developed and implemented to minimize employee exposure to cadmium when maintenance of ventilation systems and changing of filters is being conducted.

(e) Compliance program.

(i) Where employee exposure to cadmium exceeds the PEL and the employer is required under (a) of this subsection to implement controls to comply with the PEL, prior to the commencement of the job the employer shall establish and implement a written compliance program to reduce employee exposure to or below the PEL. To the extent that engineering and work practice controls cannot reduce exposures to or below the PEL, the employer shall include in the written compliance program the use of appropriate respiratory protection to achieve compliance with the PEL.

(ii) Written compliance programs shall be reviewed and updated as often and as promptly as necessary to reflect significant changes in the employer's compliance status or significant changes in the lowest air cadmium level that is technologically feasible.

(iii) A competent person shall review the comprehensive compliance program initially and after each change.

(iv) Written compliance programs shall be provided upon request for examination and copying to the director, or

authorized representatives, affected employees, and designated employee representatives.

(7) Respirator protection.

(a) General. Where respirators are required by this section, the employer shall provide them at no cost to the employee and shall assure that they are used in compliance with the requirements of this section. Respirators shall be used in the following circumstances:

(i) Where exposure levels exceed the PEL, during the time period necessary to install or implement feasible engineering and work practice controls;

(ii) In those maintenance and repair activities and during those brief or intermittent operations where exposures exceed the PEL and engineering and work practice controls are not feasible, or are not required;

(iii) In regulated areas, as prescribed in subsection (5) of this section;

(iv) Where the employer has implemented all feasible engineering and work practice controls and such controls are not sufficient to reduce exposures to or below the PEL;

(v) In emergencies;

(vi) Wherever an employee who is exposed to cadmium at or above the action level requests a respirator; and

(vii) Wherever an employee is exposed to cadmium above the PEL and engineering controls are not required under (a)(ii) of this subsection.

(b) Respirator selection.

(i) Where respirators are required under this section, the employer shall select and provide the appropriate respirator as specified in Table 1. The employer shall select respirators from among those jointly approved as acceptable protection against cadmium dust, fume, and mist by the Mine Safety and Health Administration (MSHA) and by the National Institute for Occupational Safety and Health (NIOSH) under the provisions of 30 CFR Part 11.

Table 1
Respiratory Protection for Cadmium

Airborne concentration or condition of use ^a	Required respirator type ^b
10 x or less	A half-mask, air-purifying respirator equipped with a HEPA ^c filter. ^d
25 x or less	A powered air-purifying respirator ("PAPR") with a loose-fitting hood or helmet equipped with a HEPA filter, or a supplied-air respirator with a loose-fitting hood or helmet facepiece operated in the continuous flow mode.
50 x or less	A full facepiece air-purifying respirator equipped with a HEPA filter, or a powered air-purifying respirator with a tight-fitting half-mask equipped with a HEPA filter, or a supplied air respirator with a tight-fitting half-mask operated in the continuous flow mode.

250 x or less	A powered air-purifying respirator with a tight-fitting full facepiece equipped with a HEPA filter, or a supplied-air respirator with a tight-fitting full facepiece operated in the continuous flow mode.
1000 x or less	A supplied-air respirator with half-mask or full facepiece operated in the pressure demand or other positive pressure mode.
>1000 x or unknown concentrations	A self-contained breathing apparatus with a full facepiece operated in the pressure demand or other positive pressure mode, or a supplied-air respirator with a full facepiece operated in the pressure demand or other positive pressure mode and equipped with an auxiliary escape type self-contained breathing apparatus operated in the pressure demand mode.
Fire fighting	A self-contained breathing apparatus with full facepiece operated in the pressure demand or other positive pressure mode.

Note:

^a Concentrations expressed as multiple of the PEL.

^b Respirators assigned for higher environmental concentrations may be used at lower exposure levels. Quantitative fit testing is required for all tight-fitting air purifying respirators where airborne concentration of cadmium exceeds 10 times the TWA PEL ($10 \times 5 \mu\text{g}/\text{m}^3 = 50 \mu\text{g}/\text{m}^3$). A full facepiece respirator is required when eye irritation is experienced.

^c HEPA means High Efficiency Particulate Air.

^d Fit testing, qualitative or quantitative, is required.

Source: Respiratory Decision Logic, NIOSH, 1987.

(ii) The employer shall provide a powered, air-purifying respirator (PAPR) in lieu of a negative pressure respirator wherever:

(A) An employee entitled to a respirator chooses to use this type of respirator; and

(B) This respirator will provide adequate protection to the employee.

(c) Respirator program.

(i) Where respiratory protection is required, the employer shall institute a respirator protection program in accordance with chapter 296-62 WAC, Part E.

(ii) The employer shall permit each employee who is required to use an air purifying respirator to leave the regulated area to change the filter elements or replace the respirator whenever an increase in breathing resistance is detected and shall maintain an adequate supply of filter elements for this purpose.

(iii) The employer shall also permit each employee who is required to wear a respirator to leave the regulated area to wash his or her face and the respirator facepiece whenever necessary to prevent skin irritation associated with respirator use.

(iv) If an employee exhibits difficulty in breathing while wearing a respirator during a fit test or during use, the employer shall make available to the employee a medical examination in accordance with subsection (12)(f)(ii) of this section to determine if the employee can wear a respirator while performing the required duties.

(v) No employee shall be assigned a task requiring the use of a respirator if, based upon his or her most recent examination, an examining physician determines that the employee will be unable to continue to function normally while wearing a respirator. If the physician determines the employee must be limited in, or removed from his or her current job because of the employee's inability to wear a respirator, the limitation or removal shall be in accordance with subsection (12)(k) and (l) of this section.

(d) Respirator fit testing.

(i) The employer shall assure that the respirator issued to the employee is fitted properly and exhibits the least possible facepiece leakage.

(ii) For each employee wearing a tight-fitting, air purifying respirator (either negative or positive pressure) who is exposed to airborne concentrations of cadmium that do not exceed 10 times the PEL ($10 \times 5 \mu\text{g}/\text{m}^3 = 50 \mu\text{g}/\text{m}^3$), the employer shall perform either quantitative or qualitative fit testing at the time of initial fitting and at least annually thereafter. If quantitative fit testing is used for a negative pressure respirator, a fit factor that is at least 10 times the protection factor for that class of respirators (Table 1 in (b)(i) of this subsection) shall be achieved at testing.

(iii) For each employee wearing a tight-fitting air purifying respirator (either negative or positive pressure) who is exposed to airborne concentrations of cadmium that exceed 10 times the PEL ($10 \times 5 \mu\text{g}/\text{m}^3 = 50 \mu\text{g}/\text{m}^3$), the employer shall perform quantitative fit testing at the time of initial fitting and at least annually thereafter. For negative-pressure respirators, a fit factor that is at least ten times the protection factor for that class of respirators (Table 1 in (b)(i) of this subsection) shall be achieved during quantitative fit testing.

(iv) For each employee wearing a tight-fitting, supplied-air respirator or self-contained breathing apparatus, the employer shall perform quantitative fit testing at the time of initial fitting and at least annually thereafter. This shall be accomplished by fit testing an air purifying respirator of identical type facepiece, make, model, and size as the supplied air respirator or self-contained breathing apparatus that is equipped with HEPA filters and tested as a surrogate (substitute) in the negative pressure mode. A fit factor that is at least 10 times the protection factor for that class of respirators (Table 1 in (b)(i) of this subsection) shall be achieved during quantitative fit testing. A supplied-air respirator or self-contained breathing apparatus with the same type facepiece, make, model, and size as the air purifying respirator with which the employee passed the quantitative fit test may then be used by that employee up to the protection factor listed in Table 1 in (b)(i) of this subsection for that class of respirators.

(v) Fit testing shall be conducted in accordance with WAC 296-62-07445. Appendix C.

(8) Emergency situations. The employer shall develop and implement a written plan for dealing with emergency situations involving substantial releases of airborne cadmium.

The plan shall include provisions for the use of appropriate respirators and personal protective equipment. In addition, employees not essential to correcting the emergency situation shall be restricted from the area and normal operations halted in that area until the emergency is abated.

(9) Protective work clothing and equipment

(a) Provision and use. If an employee is exposed to airborne cadmium above the PEL or where skin or eye irritation is associated with cadmium exposure at any level, the employer shall provide at no cost to the employee, and assure that the employee uses, appropriate protective work clothing and equipment that prevents contamination of the employee and the employee's garments. Protective work clothing and equipment includes, but is not limited to:

- (i) Coveralls or similar full-body work clothing;
- (ii) Gloves, head coverings, and boots or foot coverings; and
- (iii) Face shields, vented goggles, or other appropriate protective equipment that complies with WAC 296-155-215.

(b) Removal and storage.

(i) The employer shall assure that employees remove all protective clothing and equipment contaminated with cadmium at the completion of the work shift and do so only in change rooms provided in accordance with subsection (10)(a) of this section.

(ii) The employer shall assure that no employee takes cadmium-contaminated protective clothing or equipment from the workplace, except for employees authorized to do so for purposes of laundering, cleaning, maintaining, or disposing of cadmium-contaminated protective clothing and equipment at an appropriate location or facility away from the workplace.

(iii) The employer shall assure that contaminated protective clothing and equipment, when removed for laundering, cleaning, maintenance, or disposal, is placed and stored in sealed, impermeable bags or other closed, impermeable containers that are designed to prevent dispersion of cadmium dust.

(iv) The employer shall assure that containers of contaminated protective clothing and equipment that are to be taken out of the change rooms or the workplace for laundering, cleaning, maintenance or disposal shall bear labels in accordance with subsection (13)(c) of this section.

(c) Cleaning, replacement, and disposal.

(i) The employer shall provide the protective clothing and equipment required by (a) of this subsection in a clean and dry condition as often as necessary to maintain its effectiveness, but in any event at least weekly. The employer is responsible for cleaning and laundering the protective clothing and equipment required by this subsection to maintain its effectiveness and is also responsible for disposing of such clothing and equipment.

(ii) The employer also is responsible for repairing or replacing required protective clothing and equipment as needed to maintain its effectiveness. When rips or tears are detected while an employee is working they shall be immediately mended, or the worksuit shall be immediately replaced.

(iii) The employer shall prohibit the removal of cadmium from protective clothing and equipment by blowing, shaking, or any other means that disperses cadmium into the air.

(iv) The employer shall assure that any laundering of contaminated clothing or cleaning of contaminated equipment in the workplace is done in a manner that prevents the release of airborne cadmium in excess of the permissible exposure limit prescribed in subsection (3) of this section.

(v) The employer shall inform any person who launders or cleans protective clothing or equipment contaminated with cadmium of the potentially harmful effects of exposure to cadmium, and that the clothing and equipment should be laundered or cleaned in a manner to effectively prevent the release of airborne cadmium in excess of the PEL.

(10) Hygiene areas and practices.

(a) General. For employees whose airborne exposure to cadmium is above the PEL, the employer shall provide clean change rooms, handwashing facilities, showers, and lunchroom facilities that comply with WAC 296-155-140.

(b) Change rooms. The employer shall assure that change rooms are equipped with separate storage facilities for street clothes and for protective clothing and equipment, which are designed to prevent dispersion of cadmium and contamination of the employee's street clothes.

(c) Showers and handwashing facilities.

(i) The employer shall assure that employees whose airborne exposure to cadmium is above the PEL shower during the end of the work shift.

(ii) The employer shall assure that employees who are exposed to cadmium above the PEL wash their hands and faces prior to eating, drinking, smoking, chewing tobacco or gum, or applying cosmetics.

(d) Lunchroom facilities.

(i) The employer shall assure that the lunchroom facilities are readily accessible to employees, that tables for eating are maintained free of cadmium, and that no employee in a lunchroom facility is exposed at any time to cadmium at or above a concentration of 2.5 µg/m³.

(ii) The employer shall assure that employees do not enter lunchroom facilities with protective work clothing or equipment unless surface cadmium has been removed from the clothing and equipment by HEPA vacuuming or some other method that removes cadmium dust without dispersing it.

(11) Housekeeping.

(a) All surfaces shall be maintained as free as practicable of accumulations of cadmium.

(b) All spills and sudden releases of material containing cadmium shall be cleaned up as soon as possible.

(c) Surfaces contaminated with cadmium shall, wherever possible, be cleaned by vacuuming or other methods that minimize the likelihood of cadmium becoming airborne.

(d) HEPA-filtered vacuuming equipment or equally effective filtration methods shall be used for vacuuming. The equipment shall be used and emptied in a manner that minimizes the reentry of cadmium into the workplace.

(e) Shoveling, dry or wet sweeping, and brushing may be used only where vacuuming or other methods that minimize the likelihood of cadmium becoming airborne have been tried and found not to be effective.

(f) Compressed air shall not be used to remove cadmium from any surface unless the compressed air is used in conjunction with a ventilation system designed to capture the dust cloud created by the compressed air.

(g) Waste, scrap, debris, bags, containers, personal protective equipment, and clothing contaminated with cadmium and consigned for disposal shall be collected and disposed of in sealed impermeable bags or other closed, impermeable containers. These bags and containers shall be labeled in accordance with subsection (13)(b) of this section.

(12) Medical surveillance.

(a) General.

(i) Scope.

(A) Currently exposed—The employer shall institute a medical surveillance program for all employees who are or may be exposed at or above the action level and all employees who perform the following tasks, operations, or jobs: Electrical grounding with cadmium-welding; cutting, brazing, burning, grinding, or welding on surfaces that were painted with cadmium-containing paints; electrical work using cadmium-coated conduit; use of cadmium containing paints; cutting and welding cadmium-plated steel; brazing or welding with cadmium alloys; fusing of reinforced steel by cadmium welding; maintaining or retrofitting cadmium-coated equipment; and, wrecking and demolition where cadmium is present. A medical surveillance program will not be required if the employer demonstrates that the employee:

(I) Is not currently exposed by the employer to airborne concentrations of cadmium at or above the action level on 30 or more days per year (twelve consecutive months); and

(II) Is not currently exposed by the employer in those tasks on 30 or more days per year (twelve consecutive months).

(B) Previously exposed—The employer shall also institute a medical surveillance program for all employees who might previously have been exposed to cadmium by the employer prior to the effective date of this section in tasks specified under (a)(i)(A) of this subsection, unless the employer demonstrates that the employee did not in the years prior to the effective date of this section work in those tasks for the employer with exposure to cadmium for an aggregated total of more than 12 months.

(ii) To determine an employee's fitness for using a respirator, the employer shall provide the limited medical examination specified in (f) of this subsection.

(iii) The employer shall assure that all medical examinations and procedures required by this section are performed by or under the supervision of a licensed physician, who has read and is familiar with the health effects WAC 296-62-07441, Appendix A, the regulatory text of this section, the protocol for sample handling and lab selection in WAC 296-62-07451, Appendix F, and the questionnaire of WAC 296-62-07447, Appendix D.

(iv) The employer shall provide the medical surveillance required by this section, including multiple physician review under (m) of this subsection without cost to employees, and at a time and place that is reasonable and convenient to employees.

(v) The employer shall assure that the collecting and handling of biological samples of cadmium in urine (CdU), cadmium in blood (CdB), and beta-2 microglobulin in urine (B₂-M) taken from employees under this section is done in a manner that assures their reliability and that analysis of biological samples of cadmium in urine (CdU), cadmium in blood (CdB), and beta-2 microglobulin in urine (B₂-M) taken from employees under this section is performed in laborato-

ries with demonstrated proficiency to perform the particular analysis. (See WAC 296-62-07451, Appendix F.)

(b) Initial examination.

(i) For employees covered by medical surveillance under (a)(i) of this subsection, the employer shall provide an initial medical examination. The examination shall be provided to those employees within 30 days after initial assignment to a job with exposure to cadmium or no later than 90 days after the effective date of this section, whichever date is later.

(ii) The initial medical examination shall include:

(A) A detailed medical and work history, with emphasis on: Past, present, and anticipated future exposure to cadmium; any history of renal, cardiovascular, respiratory, hematopoietic, reproductive, and/or musculo-skeletal system dysfunction; current usage of medication with potential nephrotoxic side-effects; and smoking history and current status; and

(B) Biological monitoring that includes the following tests:

(I) Cadmium in urine (CdU), standardized to grams of creatinine (g/Cr);

(II) Beta-2 microglobulin in urine (B₂-M), standardized to grams of creatinine (g/Cr), with pH specified, as described in WAC 296-62-07451, Appendix F; and

(III) Cadmium in blood (CdB), standardized to liters of whole blood (lwb).

(ii) Recent examination: An initial examination is not required to be provided if adequate records show that the employee has been examined in accordance with the requirements of (b)(ii) of this subsection within the past 12 months. In that case, such records shall be maintained as part of the employee's medical record and the prior exam shall be treated as if it were an initial examination for the purposes of (c) and (d) of this subsection.

(c) Actions triggered by initial biological monitoring.

(i) If the results of the biological monitoring tests in the initial examination show the employee's CdU level to be at or below 3 µg/g Cr, B₂-M level to be at or below 300 µg/g Cr and CdB level to be at or below 5 µg/lwb, then:

(A) For employees who are subject to medical surveillance under (a)(i)(A) of this subsection because of current or anticipated exposure to cadmium, the employer shall provide the minimum level of periodic medical surveillance in accordance with the requirements in (d)(i) of this subsection; and

(B) For employees who are subject to medical surveillance under (a)(i)(B) of this subsection because of prior but not current exposure, the employer shall provide biological monitoring for CdU, B₂-M, and CdB one year after the initial biological monitoring and then the employer shall comply with the requirements of (d)(vi) of this subsection.

(ii) For all employees who are subject to medical surveillance under (a)(i) of this subsection, if the results of the initial biological monitoring tests show the level of CdU to exceed 3 µg/g Cr, the level of B₂-M to be in excess of 300 µg/g Cr, or the level of CdB to be in excess of 5 µg/lwb, the employer shall:

(A) Within two weeks after receipt of biological monitoring results, reassess the employee's occupational exposure to cadmium as follows:

(I) Reassess the employee's work practices and personal hygiene;

(II) Reevaluate the employee's respirator use, if any, and the respirator program;

(III) Review the hygiene facilities;

(IV) Reevaluate the maintenance and effectiveness of the relevant engineering controls;

(V) Assess the employee's smoking history and status;

(B) Within 30 days after the exposure reassessment, specified in (c)(ii)(A) of this subsection, take reasonable steps to correct any deficiencies found in the reassessment that may be responsible for the employee's excess exposure to cadmium; and

(C) Within 90 days after receipt of biological monitoring results, provide a full medical examination to the employee in accordance with the requirements of (d)(ii) of this subsection. After completing the medical examination, the examining physician shall determine in a written medical opinion whether to medically remove the employee. If the physician determines that medical removal is not necessary, then until the employee's CdU level falls to or below 3 µg/g Cr, B₂-M level falls to or below 300 µg/g Cr and CdB level falls to or below 5 µg/lwb, the employer shall:

(I) Provide biological monitoring in accordance with (b)(ii)(B) of this subsection on a semiannual basis; and

(II) Provide annual medical examinations in accordance with (d)(ii) of this subsection.

(iii) For all employees who are subject to medical surveillance under (a)(i) of this subsection, if the results of the initial biological monitoring tests show the level of CdU to be in excess of 15 µg/g Cr, or the level of CdB to be in excess of 15 µg/lwb, or the level of B₂-M to be in excess of 1,500 µg/g Cr, the employer shall comply with the requirements of (c)(ii)(A) and (B) of this subsection. Within 90 days after receipt of biological monitoring results, the employer shall provide a full medical examination to the employee in accordance with the requirements of (d)(ii) of this subsection. After completing the medical examination, the examining physician shall determine in a written medical opinion whether to medically remove the employee. However, if the initial biological monitoring results and the biological monitoring results obtained during the medical examination both show that: CdU exceeds 15 µg/g Cr; or CdB exceeds 15 µg/lwb; or B₂-M exceeds 1500 µg/g Cr, and in addition CdU exceeds 3 µg/g Cr or CdB exceeds 5 µg/liter of whole blood, then the physician shall medically remove the employee from exposure to cadmium at or above the action level. If the second set of biological monitoring results obtained during the medical examination does not show that a mandatory removal trigger level has been exceeded, then the employee is not required to be removed by the mandatory provisions of this section. If the employee is not required to be removed by the mandatory provisions of this section or by the physician's determination, then until the employee's CdU level falls to or below 3 µg/g Cr, B₂-M level falls to or below 300 µg/g Cr and CdB level falls to or below 5 µg/lwb, the employer shall:

(A) Periodically reassess the employee's occupational exposure to cadmium;

(B) Provide biological monitoring in accordance with (b)(ii)(B) of this subsection on a quarterly basis; and

(C) Provide semiannual medical examinations in accordance with (d)(ii) of this subsection.

(iv) For all employees to whom medical surveillance is provided, beginning on January 1, 1999, and in lieu of (c)(iii) of this subsection, whenever the results of initial biological monitoring tests show the employee's CdU level to be in excess of 7 µg/g Cr, or B₂-M level to be in excess of 750 µg/g Cr, or CdB level to be in excess of 10 µg/lwb, the employer shall comply with the requirements of (c)(ii)(A) and (B) of this subsection. Within 90 days after receipt of biological monitoring results, the employer shall provide a full medical examination to the employee in accordance with the requirements of (d)(ii) of this subsection. After completing the medical examination, the examining physician shall determine in a written medical opinion whether to medically remove the employee. However, if the initial biological monitoring results and the biological monitoring results obtained during the medical examination both show that: CdU exceeds 7 µg/g Cr; or CdB exceeds 10 µg/lwb; or B₂-M exceeds 750 µg/g Cr, and in addition CdU exceeds 3 µg/g Cr or CdB exceeds 5 µg/liter of whole blood, then the physician shall medically remove the employee from exposure to cadmium at or above the action level. If the second set of biological monitoring results obtained during the medical examination does not show that a mandatory removal trigger level has been exceeded, then the employee is not required to be removed by the mandatory provisions of this section. If the employee is not required to be removed by the mandatory provisions of this section or by the physician's determination, then until the employee's CdU level falls to or below 3 µg/g Cr, B₂-M level falls to or below 300 µg/g Cr and CdB level falls to or below 5 µg/lwb, the employer shall:

(A) Periodically reassess the employee's occupational exposure to cadmium;

(B) Provide biological monitoring in accordance with (b)(ii)(B) of this subsection on a quarterly basis; and

(C) Provide semiannual medical examinations in accordance with (d)(ii) of this subsection.

(d) Periodic medical surveillance.

(i) For each employee who is covered by medical surveillance under (a)(i)(A) of this subsection because of current or anticipated exposure to cadmium, the employer shall provide at least the minimum level of periodic medical surveillance, which consists of periodic medical examinations and periodic biological monitoring. A periodic medical examination shall be provided within one year after the initial examination required by (b) of this subsection and thereafter at least biennially. Biological sampling shall be provided at least annually either as part of a periodic medical examination or separately as periodic biological monitoring.

(ii) The periodic medical examination shall include:

(A) A detailed medical and work history, or update thereof, with emphasis on: Past, present, and anticipated future exposure to cadmium; smoking history and current status; reproductive history; current use of medications with potential nephrotoxic side-effects; any history of renal, cardiovascular, respiratory, hematopoietic, and/or musculoskeletal system dysfunction; and as part of the medical and work history, for employees who wear respirators, questions 3 through 11 and 25 through 32 in WAC 296-62-07447, Appendix D;

(B) A complete physical examination with emphasis on: Blood pressure, the respiratory system, and the urinary system;

(C) A 14 inch by 17 inch, or a reasonably standard sized posterior-anterior chest x-ray (after the initial x-ray, the frequency of chest x-rays is to be determined by the examining physician);

(D) Pulmonary function tests, including forced vital capacity (FVC) and forced expiratory volume at 1 second (FEV1);

(E) Biological monitoring, as required in (b)(ii)(B) of this subsection;

(F) Blood analysis, in addition to the analysis required under (b)(ii)(B) of this subsection, including blood urea nitrogen, complete blood count, and serum creatinine;

(G) Urinalysis, in addition to the analysis required under (b)(ii)(B) of this subsection, including the determination of albumin, glucose, and total and low molecular weight proteins;

(H) For males over 40 years old, prostate palpation, or other at least as effective diagnostic test(s); and

(I) Any additional tests or procedures deemed appropriate by the examining physician.

(iii) Periodic biological monitoring shall be provided in accordance with (b)(ii)(B) of this subsection.

(iv) If the results of periodic biological monitoring or the results of biological monitoring performed as part of the periodic medical examination show the level of the employee's CdU, B₂-M, or CdB to be in excess of the levels specified in (c)(ii) and (iii) of this subsection; or, beginning on January 1, 1999, in excess of the levels specified in (c)(ii) or (iv) of this subsection, the employer shall take the appropriate actions specified in (c)(ii) through (iv) of this subsection, respectively.

(v) For previously exposed employees under (a)(i)(B) of this subsection:

(A) If the employee's levels of CdU did not exceed 3 µg/g Cr, CdB did not exceed 5 µg/lwb, and B₂-M did not exceed 300 µg/g Cr in the initial biological monitoring tests, and if the results of the follow-up biological monitoring required by (c)(i)(B) of this subsection one year after the initial examination confirm the previous results, the employer may discontinue all periodic medical surveillance for that employee.

(B) If the initial biological monitoring results for CdU, CdB, or B₂-M were in excess of the levels specified in (c)(i) of this subsection, but subsequent biological monitoring results required by (c)(ii) through (iv) of this subsection show that the employee's CdU levels no longer exceed 3 µg/g Cr, CdB levels no longer exceed 5 µg/lwb, and B₂-M levels no longer exceed 300 µg/g Cr, the employer shall provide biological monitoring for CdU, CdB, and B₂-M one year after these most recent biological monitoring results. If the results of the follow-up biological monitoring specified in this section, confirm the previous results, the employer may discontinue all periodic medical surveillance for that employee.

(C) However, if the results of the follow-up tests specified in (d)(v)(A) or (B) of this subsection indicate that the level of the employee's CdU, B₂-M, or CdB exceeds these same levels, the employer is required to provide annual medical examinations in accordance with the provisions of

(d)(ii) of this subsection until the results of biological monitoring are consistently below these levels or the examining physician determines in a written medical opinion that further medical surveillance is not required to protect the employee's health.

(vi) A routine, biennial medical examination is not required to be provided in accordance with (c)(i) and (d) of this subsection if adequate medical records show that the employee has been examined in accordance with the requirements of (d)(ii) of this subsection within the past 12 months. In that case, such records shall be maintained by the employer as part of the employee's medical record, and the next routine, periodic medical examination shall be made available to the employee within two years of the previous examination.

(e) Actions triggered by medical examinations. If the results of a medical examination carried out in accordance with this section indicate any laboratory or clinical finding consistent with cadmium toxicity that does not require employer action under (b), (c), or (d) of this subsection, the employer shall take the following steps and continue to take them until the physician determines that they are no longer necessary.

(i) Periodically reassess: The employee's work practices and personal hygiene; the employee's respirator use, if any; the employee's smoking history and status; the respiratory protection program; the hygiene facilities; the maintenance and effectiveness of the relevant engineering controls; and take all reasonable steps to correct the deficiencies found in the reassessment that may be responsible for the employee's excess exposure to cadmium.

(ii) Provide semiannual medical reexaminations to evaluate the abnormal clinical sign(s) of cadmium toxicity until the results are normal or the employee is medically removed; and

(iii) Where the results of tests for total proteins in urine are abnormal, provide a more detailed medical evaluation of the toxic effects of cadmium on the employee's renal system.

(f) Examination for respirator use.

(i) To determine an employee's fitness for respirator use, the employer shall provide a medical examination that includes the elements specified in (f)(i)(A) through (D) of this subsection. This examination shall be provided prior to the employee's being assigned to a job that requires the use of a respirator or no later than 90 days after this section goes into effect, whichever date is later, to any employee without a medical examination within the preceding 12 months that satisfies the requirements of this section.

(A) A detailed medical and work history, or update thereof, with emphasis on: Past exposure to cadmium; smoking history and current status; any history of renal, cardiovascular, respiratory, hematopoietic, and/or musculoskeletal system dysfunction; a description of the job for which the respirator is required; and questions 3 through 11 and 25 through 32 in WAC 296-62-07447, Appendix D;

(B) A blood pressure test;

(C) Biological monitoring of the employee's levels of CdU, CdB and B₂-M in accordance with the requirements of (b)(ii)(B) of this subsection, unless such results already have been obtained within the twelve months; and

(D) Any other test or procedure that the examining physician deems appropriate.

(ii) After reviewing all the information obtained from the medical examination required in (f)(i) of this subsection, the physician shall determine whether the employee is fit to wear a respirator.

(iii) Whenever an employee has exhibited difficulty in breathing during a respirator fit test or during use of a respirator, the employer, as soon as possible, shall provide the employee with a periodic medical examination in accordance with (d)(ii) of this subsection to determine the employee's fitness to wear a respirator.

(iv) Where the results of the examination required under (f)(i), (ii), or (iii) of this subsection are abnormal, medical limitation or prohibition of respirator use shall be considered. If the employee is allowed to wear a respirator, the employee's ability to continue to do so shall be periodically evaluated by a physician.

(g) Emergency examinations.

(i) In addition to the medical surveillance required in (b) through (f) of this subsection, the employer shall provide a medical examination as soon as possible to any employee who may have been acutely exposed to cadmium because of an emergency.

(ii) The examination shall include the requirements of (d)(ii), of this subsection, with emphasis on the respiratory system, other organ systems considered appropriate by the examining physician, and symptoms of acute overexposure, as identified in Appendix A, WAC 296-62-07441 (2)(b)(i) and (ii) and (4).

(h) Termination of employment examination.

(i) At termination of employment, the employer shall provide a medical examination in accordance with (d)(ii) of this subsection, including a chest x-ray where necessary, to any employee to whom at any prior time the employer was required to provide medical surveillance under (a)(i) or (g) of this subsection. However, if the last examination satisfied the requirements of (d)(ii) of this subsection and was less than six months prior to the date of termination, no further examination is required unless otherwise specified in (c) or (e) of this subsection;

(ii) In addition, if the employer has discontinued all periodic medical surveillance under (d)(v) of this subsection, no termination of employment medical examination is required.

(i) Information provided to the physician. The employer shall provide the following information to the examining physician:

(i) A copy of this standard and appendices;

(ii) A description of the affected employee's former, current, and anticipated duties as they relate to the employee's occupational exposure to cadmium;

(iii) The employee's former, current, and anticipated future levels of occupational exposure to cadmium;

(iv) A description of any personal protective equipment, including respirators, used or to be used by the employee, including when and for how long the employee has used that equipment; and

(v) Relevant results of previous biological monitoring and medical examinations.

(j) Physician's written medical opinion.

(i) The employer shall promptly obtain a written, signed, medical opinion from the examining physician for each medical examination performed on each employee. This written opinion shall contain:

(A) The physician's diagnosis for the employee;

(B) The physician's opinion as to whether the employee has any detected medical condition(s) that would place the employee at increased risk of material impairment to health from further exposure to cadmium, including any indications of potential cadmium toxicity;

(C) The results of any biological or other testing or related evaluations that directly assess the employee's absorption of cadmium;

(D) Any recommended removal from, or limitation on the activities or duties of the employee or on the employee's use of personal protective equipment, such as respirators;

(E) A statement that the physician has clearly and carefully explained to the employee the results of the medical examination, including all biological monitoring results and any medical conditions related to cadmium exposure that require further evaluation or treatment, and any limitation on the employee's diet or use of medications.

(ii) The employer shall promptly obtain a copy of the results of any biological monitoring provided by an employer to an employee independently of a medical examination under (b) and (d) of this subsection, and, in lieu of a written medical opinion, an explanation sheet explaining those results.

(iii) The employer shall instruct the physician not to reveal orally or in the written medical opinion given to the employer specific findings or diagnoses unrelated to occupational exposure to cadmium.

(k) Medical removal protection (MRP).

(i) General.

(A) The employer shall temporarily remove an employee from work where there is excess exposure to cadmium on each occasion that medical removal is required under (c), (d), or (f) of this subsection and on each occasion that a physician determines in a written medical opinion that the employee should be removed from such exposure. The physician's determination may be based on biological monitoring results, inability to wear a respirator, evidence of illness, other signs or symptoms of cadmium-related dysfunction or disease, or any other reason deemed medically sufficient by the physician.

(B) The employer shall medically remove an employee in accordance with (k) of this subsection regardless of whether at the time of removal a job is available into which the removed employee may be transferred.

(C) Whenever an employee is medically removed under (k) of this subsection, the employer shall transfer the removed employee to a job where the exposure to cadmium is within the permissible levels specified in subsection (12) of this section as soon as one becomes available.

(D) For any employee who is medically removed under the provisions of (k)(i) of this subsection, the employer shall provide follow-up medical examinations semiannually until, in a written medical opinion, the examining physician determines that either the employee may be returned to his/her former job status or the employee must be permanently removed from excess cadmium exposure.

(E) The employer may not return an employee who has been medically removed for any reason to his/her former job status until a physician determines in a written medical opinion that continued medical removal is no longer necessary to protect the employee's health.

(ii) Where an employee is found unfit to wear a respirator under (f)(ii) of this subsection, the employer shall remove the employee from work where exposure to cadmium is above the PEL.

(iii) Where removal is based upon any reason other than the employee's inability to wear a respirator, the employer shall remove the employee from work where exposure to cadmium is at or above the action level.

(iv) Except as specified in (k)(v) of this subsection, no employee who was removed because his/her level of CdU, CdB and/or B₂-M exceeded the trigger levels in (c) or (d) of this subsection may be returned to work with exposure to cadmium at or above the action level until the employee's levels of CdU fall to or below 3 µg/g Cr, CdB fall to or below 5 µg/lwb, and B₂-M fall to or below 300 µg/g Cr.

(v) However, when in the examining physician's opinion continued exposure to cadmium will not pose an increased risk to the employee's health and there are special circumstances that make continued medical removal an inappropriate remedy, the physician shall fully discuss these matters with the employee, and then in a written determination may return a worker to his/her former job status despite what would otherwise be unacceptably high biological monitoring results. Thereafter and until such time as the employee's biological monitoring results have decreased to levels where he/she could have been returned to his/her former job status, the returned employee shall continue medical surveillance as if he/she were still on medical removal. Until such time, the employee is no longer subject to mandatory medical removal. Subsequent questions regarding the employee's medical removal shall be decided solely by a final medical determination.

(vi) Where an employer, although not required by this section to do so, removes an employee from exposure to cadmium or otherwise places limitations on an employee due to the effects of cadmium exposure on the employee's medical condition, the employer shall provide the same medical removal protection benefits to that employee under (I) of this subsection as would have been provided had the removal been required under (k) of this subsection.

(I) Medical removal protection benefits.

(i) The employer shall provide medical removal protection benefits to an employee for up to a maximum of 18 months each time, and while the employee is temporarily medically removed under (k) of this subsection.

(ii) For purposes of this section, the requirement that the employer provide medical removal protection benefits means that the employer shall maintain the total normal earnings, seniority, and all other employee rights and benefits of the removed employee, including the employee's right to his/her former job status, as if the employee had not been removed from the employee's job or otherwise medically limited.

(iii) Where, after 18 months on medical removal because of elevated biological monitoring results, the employee's monitoring results have not declined to a low enough level to permit the employee to be returned to his/her former job status:

(A) The employer shall make available to the employee a medical examination pursuant to this section in order to obtain a final medical determination as to whether the employee may be returned to his/her former job status or must be permanently removed from excess cadmium exposure; and

(B) The employer shall assure that the final medical determination indicates whether the employee may be returned to his/her former job status and what steps, if any, should be taken to protect the employee's health.

(iv) The employer may condition the provision of medical removal protection benefits upon the employee's participation in medical surveillance provided in accordance with this section.

(m) Multiple physician review.

(i) If the employer selects the initial physician to conduct any medical examination or consultation provided to an employee under this section, the employee may designate a second physician to:

(A) Review any findings, determinations, or recommendations of the initial physician; and

(B) Conduct such examinations, consultations, and laboratory tests as the second physician deems necessary to facilitate this review.

(ii) The employer shall promptly notify an employee of the right to seek a second medical opinion after each occasion that an initial physician provided by the employer conducts a medical examination or consultation pursuant to this section. The employer may condition its participation in, and payment for, multiple physician review upon the employee doing the following within fifteen (15) days after receipt of this notice, or receipt of the initial physician's written opinion, whichever is later:

(A) Informing the employer that he or she intends to seek a medical opinion; and

(B) Initiating steps to make an appointment with a second physician.

(iii) If the findings, determinations, or recommendations of the second physician differ from those of the initial physician, then the employer and the employee shall assure that efforts are made for the two physicians to resolve any disagreement.

(iv) If the two physicians have been unable to quickly resolve their disagreement, then the employer and the employee, through their respective physicians, shall designate a third physician to:

(A) Review any findings, determinations, or recommendations of the other two physicians; and

(B) Conduct such examinations, consultations, laboratory tests, and discussions with the other two physicians as the third physician deems necessary to resolve the disagreement among them.

(v) The employer shall act consistently with the findings, determinations, and recommendations of the third physician, unless the employer and the employee reach an agreement that is consistent with the recommendations of at least one of the other two physicians.

(n) Alternate physician determination. The employer and an employee or designated employee representative may agree upon the use of any alternate form of physician determination in lieu of the multiple physician review

provided by (m) of this subsection, so long as the alternative is expeditious and at least as protective of the employee.

(o) Information the employer must provide the employee.

(i) The employer shall provide a copy of the physician's written medical opinion to the examined employee within five working days after receipt thereof.

(ii) The employer shall provide the employee with a copy of the employee's biological monitoring results and an explanation sheet explaining the results within five working days after receipt thereof.

(iii) Within 30 days after a request by an employee, the employer shall provide the employee with the information the employer is required to provide the examining physician under (i) of this subsection.

(p) Reporting. In addition to other medical events that are required to be reported on the OSHA Form No. 200, the employer shall report any abnormal condition or disorder caused by occupational exposure to cadmium associated with employment as specified in Chapter (V)(E) of the Bureau of Labor Statistics Recordkeeping Guidelines for Occupational Injuries and Illnesses.

(13) Communication of cadmium hazards to employees

(a) General. In communications concerning cadmium hazards, employers shall comply with the requirements of WISHA's Hazard Communication Standard, chapter 296-62 WAC, Part C, including but not limited to the requirements concerning warning signs and labels, material safety data sheets (MSDS), and employee information and training. In addition, employers shall comply with the following requirements:

(b) Warning signs.

(i) Warning signs shall be provided and displayed in regulated areas. In addition, warning signs shall be posted at all approaches to regulated areas so that an employee may read the signs and take necessary protective steps before entering the area.

(ii) Warning signs required by (b)(i) of this subsection shall bear the following information:

Danger, Cadmium, Cancer Hazard, Can Cause Lung and Kidney Disease, Authorized Personnel Only, Respirators Required in This Area

(iii) The employer shall assure that signs required by this section are illuminated, cleaned, and maintained as necessary so that the legend is readily visible.

(c) Warning labels.

(i) Shipping and storage containers containing cadmium, cadmium compounds, or cadmium contaminated clothing, equipment, waste, scrap, or debris shall bear appropriate warning labels, as specified in (c)(ii) of this subsection.

(ii) The warning labels shall include at least the following information:

Danger, Contains Cadmium, Cancer Hazard, Avoid Creating Dust, Can Cause Lung and Kidney Disease

(iii) Where feasible, installed cadmium products shall have a visible label or other indication that cadmium is present.

(d) Employee information and training.

(i) The employer shall institute a training program for all employees who are potentially exposed to cadmium,

and maintain a record of the contents of such program.

(ii) Training shall be provided prior to or at the time of initial assignment to a job involving potential exposure to cadmium and at least annually thereafter.

(iii) The employer shall make the training program understandable to the employee and shall assure that each employee is informed of the following:

(A) The health hazards associated with cadmium exposure, with special attention to the information incorporated in WAC 296-62-07441, Appendix A;

(B) The quantity, location, manner of use, release, and storage of cadmium in the workplace and the specific nature of operations that could result in exposure to cadmium, especially exposures above the PEL;

(C) The engineering controls and work practices associated with the employee's job assignment;

(D) The measures employees can take to protect themselves from exposure to cadmium, including modification of such habits as smoking and personal hygiene, and specific procedures the employer has implemented to protect employees from exposure to cadmium such as appropriate work practices, emergency procedures, and the provision of personal protective equipment;

(E) The purpose, proper selection, fitting, proper use, and limitations of respirators and protective clothing;

(F) The purpose and a description of the medical surveillance program required by subsection (12) of this section;

(G) The contents of this section and its appendices; and

(H) The employee's rights of access to records under chapter 296-62 WAC, Part B.

(iv) Additional access to information and training program and materials.

(A) The employer shall make a copy of this section and its appendices readily available to all affected employees and shall provide a copy without cost if requested.

(B) Upon request, the employer shall provide to the director or authorized representative, all materials relating to the employee information and the training program.

(e) Multi-employer workplace. In a multi-employer workplace, an employer who produces, uses, or stores cadmium in a manner that may expose employees of other employers to cadmium shall notify those employers of the potential hazard in accordance with WAC 296-62-05409 of the hazard communication standard.

(14) Recordkeeping.

(a) Exposure monitoring.

(i) The employer shall establish and keep an accurate record of all air monitoring for cadmium in the workplace.

(ii) This record shall include at least the following information:

(A) The monitoring date, shift, duration, air volume, and results in terms of an 8-hour TWA of each sample taken, and if cadmium is not detected, the detection level;

(B) The name, Social Security number, and job classification of all employees monitored and of all other employees whose exposures the monitoring result is intended to represent, including, where applicable, a description of how it was determined that the employee's monitoring result could be taken to represent other employee's exposures;

(C) A description of the sampling and analytical methods used and evidence of their accuracy;

(D) The type of respiratory protective device, if any, worn by the monitored employee and by any other employee whose exposure the monitoring result is intended to represent;

(E) A notation of any other conditions that might have affected the monitoring results;

(F) Any exposure monitoring or objective data that were used and the levels.

(iii) The employer shall maintain this record for at least thirty (30) years, in accordance with WAC 296-62-05207.

(iv) The employer shall also provide a copy of the results of an employee's air monitoring prescribed in subsection (4) of this section to an industry trade association and to the employee's union, if any, or, if either of such associations or unions do not exist, to another comparable organization that is competent to maintain such records and is reasonably accessible to employers and employees in the industry.

(b) Objective data for exemption from requirement for initial monitoring.

(i) For purposes of this section, objective data are information demonstrating that a particular product or material containing cadmium or a specific process, operation, or activity involving cadmium cannot release dust or fumes in concentrations at or above the action level even under the worst-case release conditions. Objective data can be obtained from an industry-wide study or from laboratory product test results from manufacturers of cadmium-containing products or materials. The data the employer uses from an industry-wide survey must be obtained under workplace conditions closely resembling the processes, types of material, control methods, work practices, and environmental conditions in the employer's current operations.

(ii) The employer shall maintain the record for at least 30 years of the objective data relied upon.

(c) Medical surveillance.

(i) The employer shall establish and maintain an accurate record for each employee covered by medical surveillance under (a)(i) of this subsection.

(ii) The record shall include at least the following information about the employee:

(A) Name, Social Security number, and description of duties;

(B) A copy of the physician's written opinions and of the explanation sheets for biological monitoring results;

(C) A copy of the medical history, and the results of any physical examination and all test results that are required to be provided by this section, including biological tests, x-rays, pulmonary function tests, etc., or that have been obtained to further evaluate any condition that might be related to cadmium exposure;

(D) The employee's medical symptoms that might be related to exposure to cadmium; and

(E) A copy of the information provided to the physician as required by subsection (12)(i) of this section.

(iii) The employer shall assure that this record is maintained for the duration of employment plus thirty (30) years, in accordance with WAC 296-62-05207.

(iv) At the employee's request, the employer shall promptly provide a copy of the employee's medical record,

or update as appropriate, to a medical doctor or a union specified by the employee.

(d) Training. The employer shall certify that employees have been trained by preparing a certification record which includes the identity of the person trained, the signature of the employer or the person who conducted the training, and the date the training was completed. The certification records shall be prepared at the completion of training and shall be maintained on file for one (1) year beyond the date of training of that employee.

(e) Availability.

(i) Except as otherwise provided for in this section, access to all records required to be maintained by (a) through (d) of this subsection shall be in accordance with the provisions of WAC 296-62-052.

(ii) Within 15 days after a request, the employer shall make an employee's medical records required to be kept by (c) of this subsection available for examination and copying to the subject employee, to designated representatives, to anyone having the specific written consent of the subject employee, and after the employee's death or incapacitation, to the employee's family members.

(f) Transfer of records. Whenever an employer ceases to do business and there is no successor employer or designated organization to receive and retain records for the prescribed period, the employer shall comply with the requirements concerning transfer of records set forth in WAC 296-62-05215.

(15) Observation of monitoring.

(a) Employee observation. The employer shall provide affected employees or their designated representatives an opportunity to observe any monitoring of employee exposure to cadmium.

(b) Observation procedures. When observation of monitoring requires entry into an area where the use of protective clothing or equipment is required, the employer shall provide the observer with that clothing and equipment and shall assure that the observer uses such clothing and equipment and complies with all other applicable safety and health procedures.

(16) Dates.

(a) Effective date. This section shall become effective on June 14, 1993.

(b) Start-up dates. All obligations of this section commence on the effective date except as follows:

(i) Exposure monitoring. Except for small businesses (fifty or fewer employees), initial monitoring required by subsection (4)(b) of this section shall be completed as soon as possible and in any event no later than 60 days after the effective date of this section. For small businesses, initial monitoring required by subsection (4)(b) of this section shall be completed as soon as possible and in any event no later than 120 days after the effective date of this section.

(ii) The permissible exposure limit (PEL). Except for small businesses, as defined under (b)(i) of this subsection, the employer shall comply with the PEL established by subsection (3) of this section as soon as possible and in any event no later than 90 days after the effective date of this section. For small businesses, the employer shall comply with the PEL established by subsection (3) of this section as soon as possible and in any event no later than 150 days after the effective date of this section.

(iii) Regulated areas. Except for small businesses, as defined under (b)(i) of this subsection, regulated areas required to be established by subsection (5) of this section shall be set up as soon as possible after the results of exposure monitoring are known and in any event no later than 90 days after the effective date of this section. For small businesses, regulated areas required to be established by subsection (5) of this section shall be set up as soon as possible after the results of exposure monitoring are known and in any event no later than 150 days after the effective date of this section.

(iv) Respiratory protection. Except for small businesses, as defined under (b)(i) of this subsection, respiratory protection required by subsection (7) of this section shall be provided as soon as possible and in any event no later than 90 days after the effective date of this section. For small businesses, respiratory protection required by subsection (7) of this section shall be provided as soon as possible and in any event no later than 150 days after the effective date of this section.

(v) Compliance program. Except for small businesses, as defined under (b)(i) of this subsection, written compliance programs required by subsection (6)(b) of this section shall be completed and available as soon as possible and in any event no later than 90 days after the effective date of this section. For small businesses, written compliance programs required by subsection (6)(b) of this section shall be completed and available as soon as possible and in any event no later than 180 days after the effective date of this section.

(vi) Methods of compliance. Except for small businesses, as defined under (b)(i) of this subsection, the engineering controls required by subsection (6)(a) of this section shall be implemented as soon as possible and in any event no later than 120 days after the effective date of this section. For small businesses, the engineering controls required by subsection (6)(a) of this section shall be implemented as soon as possible and in any event no later than 240 days after the effective date of this section. Work practice controls shall be implemented as soon as possible. Work practice controls that are directly related to engineering controls to be implemented shall be implemented as soon as possible after such engineering controls are implemented.

(vii) Hygiene and lunchroom facilities. Except for small businesses, as defined under (b)(i) of this subsection, handwashing facilities, showers, change rooms and eating facilities required by subsection (10) of this section, whether permanent or temporary, shall be provided as soon as possible and in any event no later than 60 days after the effective date of this section. For small businesses, handwashing facilities, showers, change rooms and eating facilities required by subsection (10) of this section, whether permanent or temporary, shall be provided as soon as possible and in any event no later than 120 days after the effective date of this section.

(viii) Employee information and training. Except for small businesses, as defined under (b)(i) of this subsection, employee information and training required by subsection (13)(d) of this section shall be provided as soon as possible and in any event no later than 90 days after the effective date of this section. For small businesses, employee information and training required by subsection (13)(d) of this section shall be provided as soon as possible and in any

event no later than 180 days after the effective date of this section.

(ix) Medical surveillance. Except for small businesses, as defined under (b)(i) of this subsection, initial medical examinations required by subsection (12) of this section shall be provided as soon as possible and in any event no later than 90 days after the effective date of this section. For small businesses, initial medical examinations required by subsection (12) of this section shall be provided as soon as possible and in any event no later than 180 days after the effective date of this section.

(17) Appendices.

(a) WAC 296-62-07445, Appendix C, is a part of this standard, and compliance with its contents is mandatory.

(b) Except where portions of WAC 296-62-07441, 296-62-07443, 296-62-07447, 296-62-07449, and 296-62-07451, Appendices A, B, D, E, and F, respectively, to this section are expressly incorporated in requirements of this section, these appendices are purely informational and are not intended to create any additional obligations not otherwise imposed or to detract from any existing obligations.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-174, filed 7/20/94, effective 9/20/94; 93-21-075 (Order 93-06), § 296-155-174, filed 10/20/93, effective 12/1/93; 93-07-044 (Order 93-01), § 296-155-174, filed 3/13/93, effective 4/27/93.]

WAC 296-155-176 Lead.

[Statutory Authority: Chapter 49.17 RCW. 93-22-054 (Order 93-07), § 296-155-176, filed 10/29/93, effective 12/10/93.]

WAC 296-155-17603 Scope. WAC 296-155-176, Lead, applies to all construction work where an employee may be occupationally exposed to lead. All construction work excluded from coverage in the general industry standard for lead by WAC 296-62-07521 (1)(b) is covered by this standard. Construction work is defined as work for construction, alteration and/or repair, including painting and decorating. It includes but is not limited to the following:

- (1) Demolition or salvage of structures where lead or materials containing lead are present;
- (2) Removal or encapsulation of materials containing lead;
- (3) New construction, alteration, repair, or renovation of structures, substrates, or portions thereof, that contain lead, or materials containing lead;
- (4) Installation of products containing lead;
- (5) Lead contamination/emergency cleanup;
- (6) Transportation, disposal, storage, or containment of lead or materials containing lead on the site or location at which construction activities are performed; and
- (7) Maintenance operations associated with the construction activities described in this section.

[Statutory Authority: Chapter 49.17 RCW. 93-22-054 (Order 93-07), § 296-155-17603, filed 10/29/93, effective 12/10/93.]

WAC 296-155-17605 Definitions. (1) Action level means employee exposure, without regard to the use of respirators, to an airborne concentration of lead of 30 micrograms per cubic meter of air (30 µg/m³) calculated as an 8-hour time-weighted average (TWA).

(2) Competent person means one who is capable of identifying existing and predictable lead hazards in the surroundings or working conditions and who has authorization to take prompt corrective measures to eliminate them.

(3) Director means the director of labor and industries, or his/her designated representative.

(4) Lead means metallic lead, all inorganic lead compounds, and organic lead soaps. Excluded from this definition are all other organic lead compounds.

(5) This section means WAC 296-155-176 through 296-155-17656.

[Statutory Authority: Chapter 49.17 RCW. 93-22-054 (Order 93-07), § 296-155-17605, filed 10/29/93, effective 12/10/93.]

WAC 296-155-17607 Permissible exposure limit.

(1) The employer shall assure that no employee is exposed to lead at concentrations greater than fifty micrograms per cubic meter of air ($50 \mu\text{g}/\text{m}^3$) averaged over an 8-hour period.

(2) If an employee is exposed to lead for more than 8 hours in any work day the employees' allowable exposure, as a time weighted average (TWA) for that day, shall be reduced according to the following formula:

Allowable employee exposure (in $\mu\text{g}/\text{m}^3$) = 400 divided by hours worked in the day.

(3) When respirators are used to limit employee exposure as required by this section and all the requirements of WAC 296-155-17611(1) and 296-155-17613 have been met, employee exposure may be considered to be at the level provided by the protection factor of the respirator for those periods the respirator is worn. Those periods may be averaged with exposure levels during periods when respirators are not worn to determine the employee's daily TWA exposure.

[Statutory Authority: Chapter 49.17 RCW. 93-22-054 (Order 93-07), § 296-155-17607, filed 10/29/93, effective 12/10/93.]

WAC 296-155-17609 Exposure assessment. (1) General.

(a) Each employer who has a workplace or operation covered by this standard shall initially determine if any employee may be exposed to lead at or above the action level.

(b) For the purposes of this section, employee exposure is that exposure which would occur if the employee were not using a respirator.

(c) With the exception of monitoring under subsection (3) of this section, where monitoring is required by this standard, the employer shall collect personal samples representative of a full shift including at least one sample for each job classification in each work area either for each shift or for the shift with the highest exposure level.

(d) Full shift personal samples shall be representative of the monitored employee's regular, daily exposure to lead.

(2) Protection of employees during assessment of exposure.

(a) With respect to the lead related tasks listed in this subdivision, where lead is present, until the employer performs an employee exposure assessment as required in this section and documents that the employee performing any of the listed tasks is not exposed above the PEL, the em-

ployer shall treat the employee as if the employee were exposed above the PEL, and not in excess of ten (10) times the PEL, and shall implement employee protective measures prescribed in subdivision (e) of this subsection. The tasks covered by this requirement are:

(i) Where lead containing coatings or paint are present: Manual demolition of structures (e.g. dry wall), manual scraping, manual sanding, heat gun applications, and power tool cleaning with dust collection systems;

(ii) Spray painting with lead paint.

(b) In addition, with regard to tasks not listed in subdivision (a), where the employer has any reason to believe that an employee performing the task may be exposed to lead in excess of the PEL, until the employer performs an employee exposure assessment as required by this section and documents that the employee's lead exposure is not above the PEL the employer shall treat the employee as if the employee were exposed above the PEL and shall implement employee protective measures as prescribed in subdivision (e) of this subsection.

(c) With respect to the tasks listed in this subdivision, where lead is present, until the employer performs an employee exposure assessment as required in this section, and documents that the employee performing any of the listed tasks is not exposed in excess of $500 \mu\text{g}/\text{m}^3$, the employer shall treat the employee as if the employee were exposed to lead in excess of $500 \mu\text{g}/\text{m}^3$ and shall implement employee protective measures as prescribed in subdivision (e) of this subsection. Where the employer does establish that the employee is exposed to levels of lead below $500 \mu\text{g}/\text{m}^3$, the employer may provide the exposed employee with the appropriate respirator prescribed for such use at such lower exposures, in accordance with Table 1 of WAC 296-155-17613. The tasks covered by this requirement are:

(i) Using lead containing mortar; lead burning;

(ii) Where lead containing coatings or paint are present: Rivet busting; power tool cleaning without dust collection systems; cleanup activities where dry expendable abrasives are used; and abrasive blasting enclosure movement and removal.

(d) With respect to the tasks listed in this subdivision, where lead is present, until the employer performs an employee exposure assessment as required in this section and documents that the employee performing any of the listed tasks is not exposed to lead in excess of $2,500 \mu\text{g}/\text{m}^3$ ($50 \times \text{PEL}$), the employer shall treat the employee as if the employee were exposed to lead in excess of $2,500 \mu\text{g}/\text{m}^3$ and shall implement employee protective measures as prescribed in (e) of this subsection. Where the employer does establish that the employee is exposed to levels of lead below $2,500 \mu\text{g}/\text{m}^3$, the employer may provide the exposed employee with the appropriate respirator prescribed for use at such lower exposures, in accordance with Table I of this WAC 296-155-17613. Protection described in this section is required where lead containing coatings or paint are present on structures when performing:

(i) Abrasive blasting;

(ii) Welding;

(iii) Cutting; and

(iv) Torch burning.

(e) Until the employer performs an employee exposure assessment as required by this section and determines actual

employee exposure, the employer shall provide to employees performing the tasks described in (a) through (d) of this subsection with interim protection as follows:

(i) Appropriate respiratory protection in accordance with WAC 296-155-17613.

(ii) Appropriate personal protective clothing and equipment in accordance with WAC 296-155-17615.

(iii) Change areas in accordance with WAC 296-155-17619(2).

(iv) Hand washing facilities in accordance with WAC 296-155-17619(5).

(v) Biological monitoring in accordance with WAC 296-155-17621 (1)(a), to consist of blood sampling and analysis for lead and zinc protoporphyrin levels, and

(vi) Training as required by WAC 296-155-17625 (1)(a) regarding Part C of chapter 296-62 WAC, Hazard communication; training as required by WAC 296-155-17625 (2)(c), regarding use of respirators; and training in accordance with WAC 296-155-100.

(3) Basis of initial determination.

(a) Except as provided by (c) and (d) of this subsection the employer shall monitor employee exposures and shall base initial determinations on the employee exposure monitoring results and any of the following, relevant considerations:

(i) Any information, observations, or calculations which would indicate employee exposure to lead;

(ii) Any previous measurements of airborne lead; and

(iii) Any employee complaints of symptoms which may be attributable to exposure to lead.

(b) Monitoring for the initial determination where performed may be limited to a representative sample of the exposed employees who the employer reasonably believes are exposed to the greatest airborne concentrations of lead in the workplace.

(c) Where the employer has previously monitored for lead exposures, and the data were obtained within the past 12 months during work operations conducted under workplace conditions closely resembling the processes, type of material, control methods, work practices, and environmental conditions used and prevailing in the employer's current operations, the employer may rely on such earlier monitoring results to satisfy the requirements of subdivision (a) of this subsection and subsection (5) of this section if the sampling and analytical methods meet the accuracy and confidence levels of subsection (9) of this section.

(d) Where the employer has objective data, demonstrating that a particular product or material containing lead or a specific process, operation or activity involving lead cannot result in employee exposure to lead at or above the action level during processing, use, or handling, the employer may rely upon such data instead of implementing initial monitoring.

(i) The employer shall establish and maintain an accurate record documenting the nature and relevancy of objective data as specified in WAC 296-155-17629(4), where used in assessing employee exposure in lieu of exposure monitoring.

(ii) Objective data, as described in subdivision (d) of this subsection, is not permitted to be used for exposure assessment in connection with subsection (2) of this section.

(4) Positive initial determination and initial monitoring.

(a) Where a determination conducted under subsections (1), (2) and (3) of this section shows the possibility of any employee exposure at or above the action level the employer shall conduct monitoring which is representative of the exposure for each employee in the workplace who is exposed to lead.

(b) Where the employer has previously monitored for lead exposure, and the data were obtained within the past 12 months during work operations conducted under workplace conditions closely resembling the processes, type of material, control methods, work practices, and environmental conditions used and prevailing in the employer's current operations, the employer may rely on such earlier monitoring results to satisfy the requirements of (a) of this subsection if the sampling and analytical methods meet the accuracy and confidence levels of subsection (9) of this section.

(5) Negative initial determination. Where a determination, conducted under subsections (1), (2), and (3) of this section is made that no employee is exposed to airborne concentrations of lead at or above the action level the employer shall make a written record of such determination. The record shall include at least the information specified in subsection (3)(a) of this section and shall also include the date of determination, location within the worksite, and the name and social security number of each employee monitored.

(6) Frequency.

(a) If the initial determination reveals employee exposure to be below the action level further exposure determination need not be repeated except as otherwise provided in subsection (7) of this section.

(b) If the initial determination or subsequent determination reveals employee exposure to be at or above the action level but at or below the PEL the employer shall perform monitoring in accordance with this section at least every 6 months. The employer shall continue monitoring at the required frequency until at least two consecutive measurements, taken at least 7 days apart, are below the action level at which time the employer may discontinue monitoring for that employee except as otherwise provided in subsection (7) of this section.

(c) If the initial determination reveals that employee exposure is above the PEL the employer shall perform monitoring quarterly. The employer shall continue monitoring at the required frequency until at least two consecutive measurements, taken at least 7 days apart, are at or below the PEL but at or above the action level at which time the employer shall repeat monitoring for that employee at the frequency specified in subdivision (b) of this subsection, except as otherwise provided in subsection (7) of this section. The employer shall continue monitoring at the required frequency until at least two consecutive measurements, taken at least 7 days apart, are below the action level at which time the employer may discontinue monitoring for that employee except as otherwise provided in subsection (7) of this section.

(7) Additional exposure assessments. Whenever there has been a change of equipment, process, control, personnel or a new task has been initiated that may result in additional employees being exposed to lead at or above the action level or may result in employees already exposed at or above the action level being exposed above the PEL, the employer

shall conduct additional monitoring in accordance with this section.

(8) Employee notification.

(a) Within 5 working days after completion of the exposure assessment the employer shall notify each employee in writing of the results which represent that employee's exposure.

(b) Whenever the results indicate that the representative employee exposure, without regard to respirators, is at or above the PEL the employer shall include in the written notice a statement that the employee's exposure was at or above that level and a description of the corrective action taken or to be taken to reduce exposure to below that level.

(9) Accuracy of measurement. The employer shall use a method of monitoring and analysis which has an accuracy (to a confidence level of 95%) of not less than plus or minus 25 percent for airborne concentrations of lead equal to or greater than 30 µg/m³.

[Statutory Authority: Chapter 49.17 RCW. 93-22-054 (Order 93-07), § 296-155-17609, filed 10/29/93, effective 12/10/93.]

WAC 296-155-17611 Methods of compliance. (1) Engineering and work practice controls. The employer shall implement engineering and work practice controls, including administrative controls, to reduce and maintain employee exposure to lead to or below the permissible exposure limit to the extent that such controls are feasible. Wherever all feasible engineering and work practice controls that can be instituted are not sufficient to reduce employee exposure to or below the permissible exposure limit prescribed in WAC 296-155-17607, the employer shall nonetheless use them to reduce employee exposure to the lowest feasible level and shall supplement them by the use of respiratory protection that complies with the requirements of WAC 296-155-17613.

(2) Compliance program.

(a) Prior to commencement of the job each employer shall establish and implement a written compliance program to achieve compliance with WAC 296-155-17607.

(b) Written plans for these compliance programs shall include at least the following:

(i) A description of each activity in which lead is emitted; e.g., equipment used, material involved, controls in place, crew size, employee job responsibilities, operating procedures and maintenance practices;

(ii) A description of the specific means that will be employed to achieve compliance and, where engineering controls are required engineering plans and studies used to determine methods selected for controlling exposure to lead;

(iii) A report of the technology considered in meeting the PEL;

(iv) Air monitoring data which documents the source of lead emissions;

(v) A detailed schedule for implementation of the program, including documentation such as copies of purchase orders for equipment, construction contracts, etc.;

(vi) A work practice program which includes under requirements in WAC 296-155-17615, 296-155-17617, and 296-155-17619, and incorporates other relevant work practices such as those specified in subsection (5) of this section;

(vii) An administrative control schedule required by subsection (4) of this section, if applicable;

(viii) Other relevant information.

(c) The compliance program shall provide for frequent and regular inspections of job sites, materials, and equipment to be made by a competent person.

(d) Written programs shall be submitted upon request to any affected employee or authorized employee representatives, and the director, and shall be available at the worksite for examination and copying by the director.

(e) Written programs shall be revised and updated at least every 6 months to reflect the current status of the program.

(3) Mechanical ventilation. When ventilation is used to control lead exposure, the employer shall evaluate the mechanical performance of the system in controlling exposure as necessary to maintain its effectiveness.

(4) Administrative controls. If administrative controls are used as a means of reducing employees TWA exposure to lead, the employer shall establish and implement a job rotation schedule which includes:

(a) Name or identification number of each affected employee;

(b) Duration and exposure levels at each job or work station where each affected employee is located; and

(c) Any other information which may be useful in assessing the reliability of administrative controls to reduce exposure to lead.

(5) The employer shall ensure that, to the extent relevant, employees follow good work practices such as described in Appendix B, WAC 296-155-17652.

[Statutory Authority: Chapter 49.17 RCW. 93-22-054 (Order 93-07), § 296-155-17611, filed 10/29/93, effective 12/10/93.]

WAC 296-155-17613 Respiratory protection. (1) General. Where the use of respirators is required by WAC 296-155-176 the employer shall provide, at no cost to the employee, and assure the use of respirators which comply with the requirements of this section. Respirators shall be used in the following circumstances:

(a) Whenever an employee's exposure to lead exceeds the PEL;

(b) In work situations in which engineering controls and work practices are not sufficient to reduce exposures to or below the PEL;

(c) Whenever an employee requests a respirator; and

(d) Protection for employees performing tasks as specified in WAC 296-155-17609(2).

(2) Respirator selection.

(a) Where respirators are used by WAC 296-155-176 the employer shall select the appropriate respirator or combination of respirators from Table I below.

(b) The employer shall provide a powered, air-purifying respirator in lieu of the respirator specified in Table I whenever:

(i) An employee chooses to use this type of respirator; and

(ii) This respirator will provide adequate protection to the employee.

(c) The employer shall select respirators from among those approved for protection against lead dust, fume, and

mist by the Mine Safety and Health Administration and the National Institute for Occupational Safety and Health (NIOSH) under the provisions of 30 CFR Part 11.

Table I.—Respiratory Protection for Lead Aerosols

Airborne concentration of lead or condition of use	Required respirator ^a
Not in excess of 500 µg/m ³	1/2 mask air purifying respirator with high efficiency filters. ^{b, c} 1/2 mask supplied air respirator operated in demand (negative pressure) mode.
Not in excess of 1,250 µg/m ³	Loose fitting hood or helmet powered air purifying respirator with high efficiency filters. ^c Hood or helmet supplied air respirator operated in a continuous-flow mode—e.g., type CE abrasive blasting respirators operated in a continuous-flow mode.
Not in excess of 2,500 µg/m ³	Full facepiece air purifying respirator with high efficiency filters. ^c Tight fitting powered air purifying respirator with high efficiency filters. ^c Full facepiece supplied air respirator operated in demand mode. 1/2 mask or full facepiece supplied air respirator operated in a continuous-flow mode. Full facepiece self-contained breathing apparatus (SCBA) operated in demand mode.
Not in excess of 50,000 µg/m ³	1/2 mask supplied air respirator operated in pressure demand or other positive-pressure mode.
Not in excess of 100,000 µg/m ³	Full facepiece supplied air respirator operated in pressure demand or other positive-pressure mode—e.g., type CE abrasive blasting respirators operated in a positive-pressure mode.
Greater than 100,000 µg/m ³ unknown concentration, or fire fighting	Full facepiece SCBA operated in pressure demand or other positive pressure mode.

^a Respirators specified for higher concentrations can be used at lower concentrations of lead.

^b Full facepiece is required if the lead aerosols cause eye or skin irritation at the use concentrations.

^c A high efficiency particulate filter (HEPA) means a filter that is 99.97 percent efficient against particles of 0.3 micron size or larger.

(3) Respirator usage.

(a) The employer shall assure that the respirator issued to the employee exhibits minimum facepiece leakage and that the respirator is fitted properly.

(b) Employers shall perform either quantitative or qualitative face fit tests at the time of initial fitting and at least every six months thereafter for each employee wearing negative pressure respirators. The qualitative fit tests may be used only for testing the fit of half-mask respirators where they are permitted to be worn, and shall be conducted

in accordance with appendix D, WAC 296-155-17656. The tests shall be used to select facepieces that provide the required protection as prescribed in Table I.

(c) If an employee exhibits difficulty in breathing during the fitting test or during use, the employer shall make available to the employee an examination in accordance with WAC 296-155-17621 (3)(a)(ii) to determine whether the employee can wear a respirator while performing the required duty.

(4) Respirator program.

(a) The employer shall institute a respiratory protection program in accordance with part E, chapter 296-62 WAC.

(b) The employer shall permit each employee who uses a filter respirator to change the filter elements whenever an increase in breathing resistance is detected and shall maintain an adequate supply of filter elements for this purpose.

(c) Employees who wear respirators shall be permitted to leave work areas to wash their face and respirator facepiece whenever necessary to prevent skin irritation associated with respirator use.

[Statutory Authority: Chapter 49.17 RCW. 93-22-054 (Order 93-07), § 296-155-17613, filed 10/29/93, effective 12/10/93.]

WAC 296-155-17615 Protective work clothing and equipment. (1) Provision and use. Where an employee is exposed to lead above the PEL without regard to the use of respirators, where employees are exposed to lead compounds which may cause skin or eye irritation (e.g., lead arsenate, lead azide), and as protection for employees performing tasks as specified in WAC 296-155-17609(2), the employer shall provide at no cost to the employee and assure that the employee uses appropriate protective work clothing and equipment that prevents contamination of the employee and the employee's garments such as, but not limited to:

(a) Coveralls or similar full-body work clothing;

(b) Gloves, hats, and shoes or disposable shoe coverlets; and

(c) Face shields, vented goggles, or other appropriate protective equipment which complies with WAC 296-24-078.

(2) Cleaning and replacement.

(a) The employer shall provide the protective clothing required in subsection (1) of this section in a clean and dry condition at least weekly, and daily to employees whose exposure levels without regard to a respirator are over 200 µg/m³ of lead as an 8-hour TWA.

(b) The employer shall provide for the cleaning, laundering, and disposal of protective clothing and equipment required by subsection (1) of this section.

(c) The employer shall repair or replace required protective clothing and equipment as needed to maintain their effectiveness.

(d) The employer shall assure that all protective clothing is removed at the completion of a work shift only in change areas provided for that purpose as prescribed in WAC 296-155-17619(2).

(e) The employer shall assure that contaminated protective clothing which is to be cleaned, laundered, or disposed of, is placed in a closed container in the change area which prevents dispersion of lead outside the container.

(f) The employer shall inform in writing any person who cleans or launders protective clothing or equipment of the potentially harmful effects of exposure to lead.

(g) The employer shall assure that the containers of contaminated protective clothing and equipment required by subdivision (e) of this subsection are labelled as follows:

Caution: Clothing contaminated with lead. Do not remove dust by blowing or shaking. Dispose of lead contaminated wash water in accordance with applicable local, state, or federal regulations.

(h) The employer shall prohibit the removal of lead from protective clothing or equipment by blowing, shaking, or any other means which disperses lead into the air.

[Statutory Authority: Chapter 49.17 RCW. 93-22-054 (Order 93-07), § 296-155-17615, filed 10/29/93, effective 12/10/93.]

WAC 296-155-17617 Housekeeping. (1) All surfaces shall be maintained as free as practicable of accumulations of lead.

(2) Clean-up of floors and other surfaces where lead accumulates shall wherever possible, be cleaned by vacuuming or other methods that minimize the likelihood of lead becoming airborne.

(3) Shoveling, dry or wet sweeping, and brushing may be used only where vacuuming or other equally effective methods have been tried and found not to be effective.

(4) Where vacuuming methods are selected, the vacuums shall be equipped with HEPA filters and used and emptied in a manner which minimizes the reentry of lead into the workplace.

(5) Compressed air shall not be used to remove lead from any surface unless the compressed air is used in conjunction with a ventilation system designed to capture the airborne dust created by the compressed air.

[Statutory Authority: Chapter 49.17 RCW. 93-22-054 (Order 93-07), § 296-155-17617, filed 10/29/93, effective 12/10/93.]

WAC 296-155-17619 Hygiene facilities and practices. (1) The employer shall assure that in areas where employees are exposed to lead above the PEL without regard to the use of respirators, food or beverage is not present or consumed, tobacco products are not present or used, and cosmetics are not applied.

(2) Change areas.

(a) The employer shall provide clean change areas for employees whose airborne exposure to lead is above the PEL, and as protection for employees performing tasks as specified in WAC 296-155-17609(2), without regard to the use of respirators.

(b) The employer shall assure that change areas are equipped with separate storage facilities for protective work clothing and equipment and for street clothes which prevent cross-contamination.

(c) The employer shall assure that employees do not leave the workplace wearing any protective clothing or equipment that is required to be worn during the work shift.

(3) Showers.

(a) The employer shall provide shower facilities, where feasible, for use by employees whose airborne exposure to lead is above the PEL.

(b) The employer shall assure, where shower facilities are available, that employees shower at the end of the work

shift and shall provide an adequate supply of cleansing agents and towels for use by affected employees.

(4) Eating facilities.

(a) The employer shall provide lunchroom facilities or eating areas for employees whose airborne exposure to lead is above the PEL, without regard to the use of respirators.

(b) The employer shall assure that lunchroom facilities or eating areas are as free as practicable from lead contamination and are readily accessible to employees.

(c) The employer shall assure that employees whose airborne exposure to lead is above the PEL, without regard to the use of a respirator, wash their hands and face prior to eating, drinking, smoking or applying cosmetics.

(d) The employer shall assure that employees do not enter lunchroom facilities or eating areas with protective work clothing or equipment unless surface lead dust has been removed by vacuuming, downdraft booth, or other cleaning method that limits dispersion of lead dust.

(5) Hand washing facilities.

(a) The employer shall provide adequate handwashing facilities for use by employees exposed to lead in accordance with WAC 296-155-140.

(b) Where showers are not provided the employer shall assure that employees wash their hands and face at the end of the work-shift.

[Statutory Authority: Chapter 49.17 RCW. 93-22-054 (Order 93-07), § 296-155-17619, filed 10/29/93, effective 12/10/93.]

WAC 296-155-17621 Medical surveillance. (1) General.

(a) The employer shall make available initial medical surveillance to employees occupationally exposed on any day to lead at or above the action level. Initial medical surveillance consists of biological monitoring in the form of blood sampling and analysis for lead and zinc protoporphyrin levels.

(b) The employer shall institute a medical surveillance program in accordance with subsections (2) and (3) of this section for all employees who are or may be exposed by the employer at or above the action level for more than 30 days in any consecutive 12 months;

(c) The employer shall assure that all medical examinations and procedures are performed by or under the supervision of a licensed physician.

(d) The employer shall make available the required medical surveillance including multiple physician review under subsection (3)(c) without cost to employees and at a reasonable time and place.

(2) Biological monitoring.

(a) Blood lead and ZPP level sampling and analysis. The employer shall make available biological monitoring in the form of blood sampling and analysis for lead and zinc protoporphyrin levels to each employee covered by subsection (1)(a) and (b) of this section on the following schedule:

(i) For each employee covered by subsection (1)(b) of this section, at least every 2 months for the first 6 months and every 6 months thereafter;

(ii) For each employee covered by subsection (1)(a) or (b) of this section whose last blood sampling and analysis indicated a blood lead level at or above 40 µg/dl, at least every two months. This frequency shall continue until two

consecutive blood samples and analyses indicate a blood lead level below 40 µg/dl; and

(iii) For each employee who is removed from exposure to lead due to an elevated blood lead level at least monthly during the removal period.

(b) Follow-up blood sampling tests. Whenever the results of a blood lead level test indicate that an employee's blood lead level exceeds the numerical criterion for medical removal under WAC 296-155-17623 (1)(a), the employer shall provide a second (follow-up) blood sampling test within two weeks after the employer receives the results of the first blood sampling test.

(c) Accuracy of blood lead level sampling and analysis. Blood lead level sampling and analysis provided pursuant to this WAC 296-155-176 shall have an accuracy (to a confidence level of 95 percent) within plus or minus 15 percent or 6 µg/dl, whichever is greater, and shall be conducted by a laboratory approved by OSHA.

(d) Employee notification.

(i) Within five working days after the receipt of biological monitoring results, the employer shall notify each employee in writing of their blood lead level; and

(ii) The employer shall notify each employee whose blood lead level exceeds 40 µg/dl that the standard requires temporary medical removal with Medical Removal Protection benefits when an employee's blood lead level exceeds the numerical criterion for medical removal under WAC 296-155-17623 (1)(a).

(3) Medical examinations and consultations.

(a) Frequency. The employer shall make available medical examinations and consultations to each employee covered by subsection (1)(b) of this section on the following schedule:

(i) At least annually for each employee for whom a blood sampling test conducted at any time during the preceding 12 months indicated a blood lead level at or above 40 µg/dl;

(ii) As soon as possible, upon notification by an employee either that the employee has developed signs or symptoms commonly associated with lead intoxication, that the employee desires medical advice concerning the effects of current or past exposure to lead on the employee's ability to procreate a healthy child, that the employee is pregnant, or that the employee has demonstrated difficulty in breathing during a respirator fitting test or during use; and

(iii) As medically appropriate for each employee either removed from exposure to lead due to a risk of sustaining material impairment to health, or otherwise limited pursuant to a final medical determination.

(b) Content. The content of medical examinations made available pursuant to subdivision (a)(ii) and (iii) of this subsection shall be determined by an examining physician and, if requested by an employee, shall include pregnancy testing or laboratory evaluation of male fertility. Medical examinations made available pursuant to subdivision (a)(i) of this subsection shall include the following elements:

(i) A detailed work history and a medical history, with particular attention to past lead exposure (occupational and non-occupational), personal habits (smoking, hygiene), and past gastrointestinal, hematologic, renal, cardiovascular, reproductive and neurological problems;

(ii) A thorough physical examination, with particular attention to teeth, gums, hematologic, gastrointestinal, renal, cardiovascular, and neurological systems. Pulmonary status should be evaluated if respiratory protection will be used;

(iii) A blood pressure measurement;

(iv) A blood sample and analysis which determines:

(A) Blood lead level;

(B) Hemoglobin and hematocrit determinations, red cell indices, and examination of peripheral smear morphology;

(C) Zinc protoporphyrin;

(D) Blood urea nitrogen; and,

(E) Serum creatinine;

(v) A routine urinalysis with microscopic examination; and

(vi) Any laboratory or other test relevant to lead exposure which the examining physician deems necessary by sound medical practice.

(c) Multiple physician review mechanism.

(i) If the employer selects the initial physician who conducts any medical examination or consultation provided to an employee by WAC 296-155-176, the employee may designate a second physician:

(A) To review any findings, determinations or recommendations of the initial physician; and

(B) To conduct such examinations, consultations, and laboratory tests as the second physician deems necessary to facilitate this review.

(ii) The employer shall promptly notify an employee of the right to seek a second medical opinion after each occasion that an initial physician conducts a medical examination or consultation pursuant to WAC 296-155-176. The employer may condition its participation in, and payment for, the multiple physician review mechanism upon the employee doing the following within fifteen days after receipt of the foregoing notification, or receipt of the initial physician's written opinion, whichever is later:

(A) The employee informing the employer that they intend to seek a second medical opinion; and

(B) The employee initiating steps to make an appointment with a second physician.

(iii) If the findings, determinations or recommendations of the second physician differ from those of the initial physician, then the employer and the employee shall assure that efforts are made for the two physicians to resolve any disagreement.

(iv) If the two physicians have been unable to quickly resolve their disagreement, then the employer and the employee through their respective physicians shall designate a third physician:

(A) To review any findings, determinations or recommendations of the prior physicians; and

(B) To conduct such examinations, consultations, laboratory tests and discussions with the prior physicians as the third physician deems necessary to resolve the disagreement of the prior physicians.

(v) The employer shall act consistent with the findings, determinations and recommendations of the third physician, unless the employer and the employee reach an agreement which is otherwise consistent with the recommendations of at least one of the three physicians.

(d) Information provided to examining and consulting physicians.

(i) The employer shall provide an initial physician conducting a medical examination or consultation under WAC 296-155-176 with the following information:

(A) A copy of this regulation for lead including all Appendices;

(B) A description of the affected employee's duties as they relate to the employee's exposure;

(C) The employee's exposure level or anticipated exposure level to lead and to any other toxic substance (if applicable);

(D) A description of any personal protective equipment used or to be used;

(E) Prior blood lead determinations; and

(F) All prior written medical opinions concerning the employee in the employer's possession or control.

(ii) The employer shall provide the foregoing information to a second or third physician conducting a medical examination or consultation under WAC 296-155-176 upon request either by the second or third physician, or by the employee.

(e) Written medical opinions.

(i) The employer shall obtain and furnish the employee with a copy of a written medical opinion from each examining or consulting physician which contains only the following information:

(A) The physician's opinion as to whether the employee has any detected medical condition which would place the employee at increased risk of material impairment of the employee's health from exposure to lead;

(B) Any recommended special protective measures to be provided to the employee, or limitations to be placed upon the employee's exposure to lead;

(C) Any recommended limitation upon the employee's use of respirators, including a determination of whether the employee can wear a powered air purifying respirator if a physician determines that the employee cannot wear a negative pressure respirator; and

(D) The results of the blood lead determinations.

(ii) The employer shall instruct each examining and consulting physician to:

(A) Not reveal either in the written opinion or orally, or in any other means of communication with the employer, findings, including laboratory results, or diagnoses unrelated to an employee's occupational exposure to lead; and

(B) Advise the employee of any medical condition, occupational or nonoccupational, which dictates further medical examination or treatment.

(f) Alternate physician determination mechanisms. The employer and an employee or authorized employee representative may agree upon the use of any alternate physician determination mechanism in lieu of the multiple physician review mechanism provided by subdivision (c) of this subsection so long as the alternate mechanism is as expeditious and protective as the requirements contained in this section.

(4) Chelation.

(a) The employer shall assure that any person whom he retains, employs, supervises or controls does not engage in prophylactic chelation of any employee at any time.

(b) If therapeutic or diagnostic chelation is to be performed by any person in subdivision (a) of this subsection, the employer shall assure that it be done under the

supervision of a licensed physician in a clinical setting with thorough and appropriate medical monitoring and that the employee is notified in writing prior to its occurrence.

[Statutory Authority: Chapter 49.17 RCW. 93-22-054 (Order 93-07), § 296-155-17621, filed 10/29/93, effective 12/10/93.]

WAC 296-155-17623 Medical removal protection.

(1) Temporary medical removal and return of an employee.

(a) Temporary removal due to elevated blood lead level.

The employer shall remove an employee from work having an exposure to lead at or above the action level on each occasion that a periodic and a follow-up blood sampling test conducted pursuant to WAC 296-155-176 indicate that the employee's blood lead level is at or above 50 µg/dl; and

(b) Temporary removal due to a final medical determination.

(i) The employer shall remove an employee from work having an exposure to lead at or above the action level on each occasion that a final medical determination results in a medical finding, determination, or opinion that the employee has a detected medical condition which places the employee at increased risk of material impairment to health from exposure to lead.

(ii) For the purposes of WAC 296-155-176, the phrase "final medical determination" means the written medical opinion on the employees' health status by the examining physician or, where relevant, the outcome of the multiple physician review mechanism or alternate medical determination mechanism used pursuant to the medical surveillance provisions of WAC 296-155-176.

(iii) Where a final medical determination results in any recommended special protective measures for an employee, or limitations on an employee's exposure to lead, the employer shall implement and act consistent with the recommendation.

(c) Return of the employee to former job status.

(i) The employer shall return an employee to their former job status:

(A) For an employee removed due to a blood lead level at or above 50 µg/dl when two consecutive blood sampling tests indicate that the employee's blood lead level is at or below 40 µg/dl;

(B) For an employee removed due to a final medical determination, when a subsequent final medical determination results in a medical finding, determination, or opinion that the employee no longer has a detected medical condition which places the employee at increased risk of material impairment to health from exposure to lead.

(ii) For the purposes of WAC 296-155-176, the requirement that an employer return an employee to their former job status is not intended to expand upon or restrict any rights an employee has or would have had, absent temporary medical removal, to a specific job classification or position under the terms of a collective bargaining agreement.

(d) Removal of other employee special protective measure or limitations. The employer shall remove any limitations placed on an employee or end any special protective measures provided to an employee pursuant to a final medical determination when a subsequent final medical determination indicates that the limitations or special protective measures are no longer necessary.

(e) Employer options pending a final medical determination. Where the multiple physician review mechanism, or alternate medical determination mechanism used pursuant to the medical surveillance provisions of WAC 296-155-176, has not yet resulted in a final medical determination with respect to an employee, the employer shall act as follows:

(i) Removal. The employer may remove the employee from exposure to lead, provide special protective measures to the employee, or place limitations upon the employee, consistent with the medical findings, determinations, or recommendations of any of the physicians who have reviewed the employee's health status.

(ii) Return. The employer may return the employee to their former job status, end any special protective measures provided to the employee, and remove any limitations placed upon the employee, consistent with the medical findings, determinations, or recommendations of any of the physicians who have reviewed the employee's health status, with two exceptions.

(A) If the initial removal, special protection, or limitation of the employee resulted from a final medical determination which differed from the findings, determinations, or recommendations of the initial physician or;

(B) If the employee has been on removal status for the preceding eighteen months due to an elevated blood lead level, then the employer shall await a final medical determination.

(2) Medical removal protection benefits.

(a) Provision of medical removal protection benefits. The employer shall provide an employee up to eighteen (18) months of medical removal protection benefits on each occasion that an employee is removed from exposure to lead or otherwise limited pursuant to WAC 296-155-176.

(b) Definition of medical removal protection benefits. For the purposes of WAC 296-155-176, the requirement that an employer provide medical removal protection benefits means that, as long as the job the employee was removed from continues, the employer shall maintain the total normal earnings, seniority and other employment rights and benefits of an employee, including the employee's right to their former job status as though the employee had not been medically removed from the employee's job or otherwise medically limited.

(c) Follow-up medical surveillance during the period of employee removal or limitation. During the period of time that an employee is medically removed from their job or otherwise medically limited, the employer may condition the provision of medical removal protection benefits upon the employee's participation in follow-up medical surveillance made available pursuant to WAC 296-155-176.

(d) Workers' compensation claims. If a removed employee files a claim for workers' compensation payments for a lead-related disability, then the employer shall continue to provide medical removal protection benefits pending disposition of the claim. To the extent that an award is made to the employee for earnings lost during the period of removal, the employer's medical removal protection obligation shall be reduced by such amount. The employer shall receive no credit for workers' compensation payments received by the employee for treatment-related expenses.

(e) Other credits. The employer's obligation to provide medical removal protection benefits to a removed employee

shall be reduced to the extent that the employee receives compensation for earnings lost during the period of removal either from a publicly or employer-funded compensation program, or receives income from employment with another employer made possible by virtue of the employee's removal.

(f) Voluntary removal or restriction of an employee. Where an employer, although not required by WAC 296-155-176 to do so, removes an employee from exposure to lead or otherwise places limitations on an employee due to the effects of lead exposure on the employee's medical condition, the employer shall provide medical removal protection benefits to the employee equal to that required by subdivisions (a) and (b) of this subsection.

[Statutory Authority: Chapter 49.17 RCW. 93-22-054 (Order 93-07), § 296-155-17623, filed 10/29/93, effective 12/10/93.]

WAC 296-155-17625 Employee information and training. (1) General.

(a) The employer shall communicate information concerning lead hazards according to the requirements of WISHA's Hazard Communication Standard for the construction industry, part C of chapter 296-62 WAC, including but not limited to the requirements concerning warning signs and labels, material safety data sheets (MSDS), and employee information and training. In addition, employers shall comply with the following requirements:

(b) For all employees who are subject to exposure to lead at or above the action level on any day or who are subject to exposure to lead compounds which may cause skin or eye irritation (e.g., lead arsenate, lead azide), the employer shall provide a training program in accordance with subsection (2) of this section and assure employee participation.

(c) The employer shall provide the training program as initial training prior to the time of job assignment or prior to the start up date for this requirement, whichever comes last.

(d) The employer shall also provide the training program at least annually for each employee who is subject to lead exposure at or above the action level on any day.

(2) Training program. The employer shall assure that each employee is trained in the following:

(a) The content of this standard and its appendices;

(b) The specific nature of the operations which could result in exposure to lead above the action level;

(c) The purpose, proper selection, fitting, use, and limitations of respirators;

(d) The purpose and a description of the medical surveillance program, and the medical removal protection program including information concerning the adverse health effects associated with excessive exposure to lead (with particular attention to the adverse reproductive effects on both males and females and hazards to the fetus and additional precautions for employees who are pregnant);

(e) The engineering controls and work practices associated with the employee's job assignment including training of employees to follow relevant good work practices described in Appendix B, WAC 296-155-17652;

(f) The contents of any compliance plan in effect;

(g) Instructions to employees that chelating agents should not routinely be used to remove lead from their

bodies and should not be used at all except under the direction of a licensed physician; and

(h) The employee's right of access to records under Part B, chapter 296-62 WAC.

(3) Access to information and training materials.

(a) The employer shall make readily available to all affected employees a copy of this standard and its appendices.

(b) The employer shall provide, upon request, all materials relating to the employee information and training program to affected employees and their designated representatives, and the director.

[Statutory Authority: Chapter 49.17 RCW. 93-22-054 (Order 93-07), § 296-155-17625, filed 10/29/93, effective 12/10/93.]

WAC 296-155-17627 Signs. (1) General.

(a) The employer may use signs required by other statutes, regulations or ordinances in addition to, or in combination with, signs required by this section.

(b) The employer shall assure that no statement appears on or near any sign required by this section which contradicts or detracts from the meaning of the required sign.

(2) Signs.

(a) The employer shall post the following warning signs in each work area where an employees exposure to lead is above the PEL.

WARNING
LEAD WORK AREA
POISON
NO SMOKING OR EATING

(b) The employer shall assure that signs required by this section are illuminated and cleaned as necessary so that the legend is readily visible.

[Statutory Authority: Chapter 49.17 RCW. 93-22-054 (Order 93-07), § 296-155-17627, filed 10/29/93, effective 12/10/93.]

WAC 296-155-17629 Recordkeeping. (1) Exposure assessment.

(a) The employer shall establish and maintain an accurate record of all monitoring and other data used in conducting employee exposure assessments as required in WAC 296-155-17609.

(b) Exposure monitoring records shall include:

(i) The date(s), number, duration, location and results of each of the samples taken if any, including a description of the sampling procedure used to determine representative employee exposure where applicable;

(ii) A description of the sampling and analytical methods used and evidence of their accuracy;

(iii) The type of respiratory protective devices worn, if any;

(iv) Name, social security number, and job classification of the employee monitored and of all other employees whose exposure the measurement is intended to represent; and

(v) The environmental variables that could affect the measurement of employee exposure.

(c) The employer shall maintain monitoring and other exposure assessment records in accordance with the provisions of part B, chapter 296-62 WAC.

(2) Medical surveillance.

(a) The employer shall establish and maintain an accurate record for each employee subject to medical surveillance as required by WAC 296-155-17621.

(b) This record shall include:

(i) The name, Social Security number, and description of the duties of the employee;

(ii) A copy of the physician's written opinions;

(iii) Results of any airborne exposure monitoring done on or for that employee and provided to the physician; and
(iv) Any employee medical complaints related to exposure to lead.

(c) The employer shall keep, or assure that the examining physician keeps, the following medical records:

(i) A copy of the medical examination results including medical and work history required by WAC 296-155-17621;

(ii) A description of the laboratory procedures and a copy of any standards or guidelines used to interpret the test results or references to that information;

(iii) A copy of the results of biological monitoring.

(d) The employer shall maintain or assure that the physician maintains medical records in accordance with the provisions of part B, chapter 296-62 WAC.

(3) Medical removals.

(a) The employer shall establish and maintain an accurate record for each employee removed from current exposure to lead pursuant to WAC 296-155-17623.

(b) Each record shall include:

(i) The name and social security number of the employee;

(ii) The date of each occasion that the employee was removed from current exposure to lead as well as the corresponding date on which the employee was returned to their former job status;

(iii) A brief explanation of how each removal was or is being accomplished; and

(iv) A statement with respect to each removal indicating whether or not the reason for the removal was an elevated blood lead level.

(c) The employer shall maintain each medical removal record for at least the duration of an employee's employment.

(4) Objective data for exemption from requirement for initial monitoring.

(a) For purposes of WAC 296-155-176, objective data are information demonstrating that a particular product or material containing lead or a specific process, operation, or activity involving lead cannot release dust or fumes in concentrations at or above the action level under any expected conditions of use. Objective data can be obtained from an industry-wide study or from laboratory product test results from manufacturers of lead containing products or materials. The data the employer uses from an industry-wide survey must be obtained under workplace conditions closely resembling the processes, types of material, control methods, work practices and environmental conditions in the employer's current operations.

(b) The employer shall maintain the record of the objective data relied upon for at least 30 years.

(5) Availability. The employer shall make available upon request all records required to be maintained by this section to affected employees, former employees, and their

designated representatives, and to the director for examination and copying.

(6) Transfer of records.

(a) Whenever the employer ceases to do business, the successor employer shall receive and retain all records required to be maintained by this section.

(b) Whenever the employer ceases to do business and there is no successor employer to receive and retain the records required to be maintained by WAC 296-155-176 for the prescribed period, these records shall be transmitted to the director.

(c) At the expiration of the retention period for the records required to be maintained by WAC 296-155-176, the employer shall notify the director at least 3 months prior to the disposal of such records and shall transmit those records to the director if requested within the period.

(d) The employer shall also comply with any additional requirements involving transfer of records set forth in WAC 296-62-05215.

[Statutory Authority: Chapter 49.17 RCW. 93-22-054 (Order 93-07), § 296-155-17629, filed 10/29/93, effective 12/10/93.]

WAC 296-155-17631 Observation of monitoring.

(1) Employee observation. The employer shall provide affected employees or their designated representatives an opportunity to observe any monitoring of employee exposure to lead conducted pursuant to WAC 296-155-17609.

(2) Observation procedures.

(a) Whenever observation of the monitoring of employee exposure to lead requires entry into an area where the use of respirators, protective clothing or equipment is required, the employer shall provide the observer with and assure the use of such respirators, clothing and equipment, and shall require the observer to comply with all other applicable safety and health procedures.

(b) Without interfering with the monitoring, observers shall be entitled to:

(i) Receive an explanation of the measurement procedures;

(ii) Observe all steps related to the monitoring of lead performed at the place of exposure; and

(iii) Record the results obtained or receive copies of the results when returned by the laboratory.

[Statutory Authority: Chapter 49.17 RCW. 93-22-054 (Order 93-07), § 296-155-17631, filed 10/29/93, effective 12/10/93.]

WAC 296-155-17635 Startup dates. (1) The requirements of WAC 296-155-17607 through 296-155-17631, including administrative controls and feasible work practice controls, but not including engineering controls specified in WAC 296-155-17611(1), shall be complied with as soon as possible, but no later than 60 days from the effective date of WAC 296-155-176.

(2) Feasible engineering controls specified by WAC 296-155-17611(1) shall be implemented as soon as possible, but no later than 120 days from the effective date of WAC 296-155-176.

[Statutory Authority: Chapter 49.17 RCW. 93-22-054 (Order 93-07), § 296-155-17635, filed 10/29/93, effective 12/10/93.]

WAC 296-155-17650 Appendix A to WAC 296-155-176—Substance data sheet for occupational exposure to lead. The information contained in the appendices to WAC 296-155-176 is not intended by itself, to create any additional obligations not otherwise imposed by this standard nor detract from any existing obligation.

(1) Substance identification.

(a) Substance: Pure lead (Pb) is a heavy metal at room temperature and pressure and is a basic chemical element. It can combine with various other substances to form numerous lead compounds.

(b) Compounds covered by the standard: The word "lead" when used in this standard means elemental lead, all inorganic lead compounds and a class of organic lead compounds called lead soaps. This standard does not apply to other organic lead compounds.

(c) Uses: Exposure to lead occurs in several different occupations in the construction industry, including demolition or salvage of structures where lead or lead-containing materials are present; removal or encapsulation of lead-containing materials, new construction, alteration, repair, or renovation of structures that contain lead or materials containing lead; installation of products containing lead. In addition, there are construction related activities where exposure to lead may occur, including transportation, disposal, storage, or containment of lead or materials containing lead on construction sites, and maintenance operations associated with construction activities.

(d) Permissible exposure: The permissible exposure limit (PEL) set by the standard is 50 micrograms of lead per cubic meter of air (50 µg/m³), averaged over an 8-hour workday.

(e) Action level: The standard establishes an action level of 30 micrograms of lead per cubic meter of air (30 µg/m³), averaged over an 8-hour workday. The action level triggers several ancillary provisions of the standard such as exposure monitoring, medical surveillance, and training.

(2) Health hazard data.

(a) Ways in which lead enters your body. When absorbed into your body in certain doses, lead is a toxic substance. The object of the lead standard is to prevent absorption of harmful quantities of lead. The standard is intended to protect you not only from the immediate toxic effects of lead, but also from the serious toxic effects that may not become apparent until years of exposure have passed. Lead can be absorbed into your body by inhalation (breathing) and ingestion (eating). Lead (except for certain organic lead compounds not covered by the standard, such as tetraethyl lead) is not absorbed through your skin. When lead is scattered in the air as a dust, fume respiratory tract. Inhalation of airborne lead is generally the most important source of occupational lead absorption. You can also absorb lead through your digestive system if lead gets into your mouth and is swallowed. If you handle food, cigarettes, chewing tobacco, or make-up which have lead on them or handle them with hands contaminated with lead, this will contribute to ingestion. A significant portion of the lead that you inhale or ingest gets into your blood stream. Once in your blood stream, lead is circulated throughout your body and stored in various organs and body tissues. Some of this lead is quickly filtered out of your body and excreted, but some remains in the blood and other tissues. As exposure

to lead continues, the amount stored in your body will increase if you are absorbing more lead than your body is excreting. Even though you may not be aware of any immediate symptoms of disease, this lead stored in your tissues can be slowly causing irreversible damage, first to individual cells, then to your organs and whole body systems.

(b) Effects of overexposure to lead.

(i) Short term (acute) overexposure. Lead is a potent, systemic poison that serves no known useful function once absorbed by your body. Taken in large enough doses, lead can kill you in a matter of days. A condition affecting the brain called acute encephalopathy may arise which develops quickly to seizures, coma, and death from cardiorespiratory arrest. A short term dose of lead can lead to acute encephalopathy. Short term occupational exposures of this magnitude are highly unusual, but not impossible. Similar forms of encephalopathy may, however, arise from extended, chronic exposure to lower doses of lead. There is no sharp dividing line between rapidly developing acute effects of lead, and chronic effects which take longer to acquire. Lead adversely affects numerous body systems, and causes forms of health impairment and disease which arise after periods of exposure as short as days or as long as several years.

(ii) Long-term (chronic) overexposure. Chronic overexposure to lead may result in severe damage to your blood-forming, nervous, urinary and reproductive systems. Some common symptoms of chronic overexposure include loss of appetite, metallic taste in the mouth, anxiety, constipation, nausea, pallor, excessive tiredness, weakness, insomnia, headache, nervous irritability, muscle and joint pain or soreness, fine tremors, numbness, dizziness, hyperactivity and colic. In lead colic there may be severe abdominal pain. Damage to the central nervous system in general and the brain (encephalopathy) in particular is one of the most severe forms of lead poisoning. The most severe, often fatal, form of encephalopathy may be preceded by vomiting, a feeling of dullness progressing to drowsiness and stupor, poor memory, restlessness, irritability, tremor, and convulsions. It may arise suddenly with the onset of seizures, followed by coma, and death. There is a tendency for muscular weakness to develop at the same time. This weakness may progress to paralysis often observed as a characteristic "wrist drop" or "foot drop" and is a manifestation of a disease to the nervous system called peripheral neuropathy. Chronic overexposure to lead also results in kidney disease with few, if any, symptoms appearing until extensive and most likely permanent kidney damage has occurred. Routine laboratory tests reveal the presence of this kidney disease only after about two-thirds of kidney function is lost. When overt symptoms of urinary dysfunction arise, it is often too late to correct or prevent worsening conditions, and progression to kidney dialysis or death is possible. Chronic overexposure to lead impairs the reproductive systems of both men and women. Overexposure to lead may result in decreased sex drive, impotence and sterility in men. Lead can alter the structure of sperm cells raising the risk of birth defects. There is evidence of miscarriage and stillbirth in women whose husbands were exposed to lead or who were exposed to lead themselves. Lead exposure also may result in decreased fertility, and abnormal menstrual cycles in women. The course of pregnancy may be adversely affected by

exposure to lead since lead crosses the placental barrier and poses risks to developing fetuses. Children born of parents either one of whom were exposed to excess lead levels are more likely to have birth defects, mental retardation, behavioral disorders or die during the first year of childhood. Overexposure to lead also disrupts the blood-forming system resulting in decreased hemoglobin (the substance in the blood that carries oxygen to the cells) and ultimately anemia. Anemia is characterized by weakness, pallor and fatigability as a result of decreased oxygen carrying capacity in the blood.

(iii) Health protection goals of the standard. Prevention of adverse health effects for most workers from exposure to lead throughout a working lifetime requires that a worker's blood lead level (BLL, also expressed as PbB) be maintained at or below forty micrograms per deciliter of whole blood (40 $\mu\text{g}/\text{dl}$). The blood lead levels of workers (both male and female workers) who intend to have children should be maintained below 30 $\mu\text{g}/\text{dl}$ to minimize adverse reproductive health effects to the parents and to the developing fetus. The measurement of your blood lead level (BLL) is the most useful indicator of the amount of lead being absorbed by your body. Blood lead levels are most often reported in units of milligrams (mg) or micrograms (μg) of lead (1 $\mu\text{g}=1000 \mu\text{g}$) per 100 grams (100g), 100 milliliters (100 ml) or deciliter (dl) of blood. These three units are essentially the same. Sometime BLLs are expressed in the form of mg% or $\mu\text{g}\%$. This is a shorthand notation for 100g, 100 ml, or dl. (References to BLL measurements in this standard are expressed in the form of $\mu\text{g}/\text{dl}$.)

BLL measurements show the amount of lead circulating in your blood stream, but do not give any information about the amount of lead stored in your various tissues. BLL measurements merely show current absorption of lead, not the effect that lead is having on your body or the effects that past lead exposure may have already caused. Past research into lead-related diseases, however, has focused heavily on associations between BLLs and various diseases. As a result, your BLL is an important indicator of the likelihood that you will gradually acquire a lead-related health impairment or disease.

Once your blood lead level climbs above 40 $\mu\text{g}/\text{dl}$, your risk of disease increases. There is a wide variability of individual response to lead, thus it is difficult to say that a particular BLL in a given person will cause a particular effect. Studies have associated fatal encephalopathy with BLLs as low as 150 $\mu\text{g}/\text{dl}$. Other studies have shown other forms of diseases in some workers with BLLs well below 80 $\mu\text{g}/\text{dl}$. Your BLL is a crucial indicator of the risks to your health, but one other factor is also extremely important. This factor is the length of time you have had elevated BLLs. The longer you have an elevated BLL, the greater the risk that large quantities of lead are being gradually stored in your organs and tissues (body burden). The greater your overall body burden, the greater the chances of substantial permanent damage. The best way to prevent all forms of lead-related impairments and diseases—both short term and long term—is to maintain your BLL below 40 $\mu\text{g}/\text{dl}$. The provisions of the standard are designed with this end in mind.

Your employer has prime responsibility to assure that the provisions of the standard are complied with both by the

company and by individual workers. You, as a worker, however, also have a responsibility to assist your employer in complying with the standard. You can play a key role in protecting your own health by learning about the lead hazards and their control, learning what the standard requires, following the standard where it governs your own actions, and seeing that your employer complies with provisions governing employee actions.

(iv) Reporting signs and symptoms of health problems. You should immediately notify your employer if you develop signs or symptoms associated with lead poisoning or if you desire medical advice concerning the effects of current or past exposure to lead or your ability to have a healthy child. You should also notify your employer if you have difficulty breathing during a respirator fit test or while wearing a respirator. In each of these cases, your employer must make available to you appropriate medical examinations or consultations. These must be provided at no cost to you and at a reasonable time and place. The standard contains a procedure whereby you can obtain a second opinion by a physician of your choice if your employer selected the initial physician.

[Statutory Authority: Chapter 49.17 RCW. 93-22-054 (Order 93-07), § 296-155-17650, filed 10/29/93, effective 12/10/93.]

WAC 296-155-17652 Appendix B to WAC 296-155-176—Employee standard summary. This appendix summarizes key provisions of the standard for lead in construction that you as a worker should become familiar with.

(1) Permissible exposure limit (PEL)—WAC 296-62-17607.

The standard sets a permissible exposure limit (PEL) of 50 micrograms of lead per cubic meter of air ($50 \mu\text{g}/\text{m}^3$), averaged over an 8-hour workday which is referred to as a time-weighted average (TWA). This is the highest level of lead in air to which you may be permissibly exposed over an 8-hour workday. However, since this is an 8-hour average, short exposures above the PEL are permitted so long as for each 8-hour work day your average exposure does not exceed this level. This standard, however, takes into account the fact that your daily exposure to lead can extend beyond a typical 8-hour workday as the result of overtime or other alterations in your work schedule. To deal with this situation, the standard contains a formula which reduces your permissible exposure when you are exposed more than 8 hours. For example, if you are exposed to lead for 10 hours a day, the maximum permitted average exposure would be $40 \mu\text{g}/\text{m}^3$.

(2) Exposure assessment—WAC 296-155-17609.

If lead is present in your workplace in any quantity, your employer is required to make an initial determination of whether any employee's exposure to lead exceeds the action level ($30 \mu\text{g}/\text{m}^3$ averaged over an 8-hour day). Employee exposure is that exposure which would occur if the employee were not using a respirator. This initial determination requires your employer to monitor workers' exposures unless the employee has objective data which can demonstrate conclusively that no employee will be exposed to lead in excess of the action level. Where objective data is used in lieu of actual monitoring the employer must

establish and maintain an accurate record, documenting its relevancy in assessing exposure levels for current job conditions. If such objective data is available, the employer need proceed no further on employee exposure assessment until such time that conditions have changed and the determination is no longer valid.

Objective data may be compiled from various sources, e.g., insurance companies and trade associations and information from suppliers or exposure data collected from similar operations. Objective data may also comprise previously-collected sampling data including area monitoring. If it cannot be determined through using objective data that worker exposure is less than the action level, your employer must conduct monitoring or must rely on relevant previous personal sampling, if available. Where monitoring is required for the initial determination, it may be limited to a representative number of employees who are reasonably expected to have the highest exposure levels. If your employer has conducted appropriate air sampling for lead in the past 12 months, they may use these results, provided they are applicable to the same employee tasks and exposure conditions and meet the requirements for accuracy as specified in the standard. As with objective data, if such results are relied upon for the initial determination, your employer must establish and maintain a record as to the relevancy of such data to current job conditions.

If there have been any employee complaints of symptoms which may be attributable to exposure to lead or if there is any other information or observations which would indicate employee exposure to lead, this must also be considered as part of the initial determination. If this initial determination shows that a reasonable possibility exists that any employee may be exposed, without regard to respirator, over the action level, your employer must set up an air monitoring program to determine the exposure level representative of each employee exposed to lead at your workplace. In carrying out this air monitoring program, your employer is not required to monitor the exposure of every employee, but they must monitor a representative number of employees and job types. Enough sampling must be done to enable each employee's exposure level to be reasonably represent full shift exposure. In addition, these air samples must be taken under conditions which represent each employee's regular, daily exposure to lead. Sampling performed in the past 12 months may be used to determine exposures above the action level if such sampling was conducted during work activities essentially similar to present work conditions.

The standard lists certain tasks which may likely result in exposures to lead in excess of the PEL and, in some cases, exposures in excess of 50 times the PEL. If you are performing any of these tasks, your employer must provide you with appropriate respiratory protection, protective clothing and equipment, change areas, hand washing facilities, biological monitoring, and training until such time that an exposure assessment is conducted which demonstrates that your exposure level is below the PEL.

If you are exposed to lead and air sampling is performed, your employer is required to notify you in writing within 5 working days of the air monitoring results which represent your exposure. If the results indicate that your exposure exceeds the PEL (without regard to your use of a

respirator), then your employer must also notify you of this in writing, and provide you with a description of the corrective action that has been taken or will be taken to reduce your exposure.

Your exposure must be rechecked by monitoring, at least every six months if your exposure is at or over the action level but below the PEL. Your employer may discontinue monitoring for you if 2 consecutive measurements, taken at least 7 days apart, are at or below the action level. Air monitoring must be repeated every 3 months if you are exposed over the PEL. Your employer must continue monitoring for you at this frequency until 2 consecutive measurements, taken at least 7 days apart, are below the PEL but above the action level, at which time your employer must repeat monitoring of your exposure every six months and may discontinue monitoring only after your exposure drops to or below the action level. However, whenever there is a change of equipment, process, control, or personnel or a new type of job is added at your workplace which may result in new or additional exposure to lead, your employer must perform additional monitoring.

(3) Methods of compliance—WAC 296-155-17611.

Your employer is required to assure that no employee is exposed to lead in excess of the PEL as an 8-hour TWA. The standard for lead in construction requires employers to institute engineering and work practice controls including administrative controls to the extent feasible to reduce employee exposure to lead. Where such controls are feasible but not adequate to reduce exposures below the PEL they must be used nonetheless to reduce exposures to the lowest level that can be accomplished by these means and then supplemented with appropriate respiratory protection.

Your employer is required to develop and implement a written compliance program prior to the commencement of any job where employee exposures may reach the PEL as an 8-hour TWA. The standard identifies the various elements that must be included in the plan. For example, employers are required to include a description of operations in which lead is emitted, detailing other relevant information about the operation such as the type of equipment used, the type of material involved, employee job responsibilities, operating procedures and maintenance practices. In addition, your employer's compliance plan must specify the means that will be used to achieve compliance and, where engineering controls are required, include any engineering plans or studies that have been used to select the control methods. If administrative controls involving job rotation are used to reduce employee exposure to lead, the job rotation schedule must be included in the compliance plan. The plan must also detail the type of protective clothing and equipment, including respirator, housekeeping and hygiene practices that will be used to protect you from the adverse effects of exposure to lead.

The written compliance program must be made available, upon request, to affected employees and their designated representatives, and the director.

Finally, the plan must be reviewed and updated at least every 6 months to assure it reflects the current status in exposure control.

(4) Respiratory protection—WAC 296-155-17613.

Your employer is required to provide and assure your use of respirator when your exposure to lead is not con-

trolled below the PEL by other means. The employer must pay the cost of the respirator. Whenever you request one, your employer is also required to provide you a respirator even if your air exposure level is not above the PEL. You might desire a respirator when, for example, you have received medical advice that your lead absorption should be decreased. Or, you may intend to have children in the near future, and want to reduce the level of lead in your body to minimize adverse reproductive effects. While respirator are the least satisfactory means of controlling your exposure, they are capable of providing significant protection if properly chosen, fitted, worn, cleaned, maintained, and replaced when they stop providing adequate protection.

Your employer is required to select respirator from the types listed in Table I of the Respiratory Protection section of the standard. Any respirator chosen must be approved by the Mine Safety and Health Administration (MSHA) or the National Institute for Occupational Safety and Health (NIOSH). This respirator selection table will enable your employer to choose a type of respirator which will give you a proper amount of protection based on your airborne lead exposure. Your employer may select a type of respirator that provides greater protection than that required by the standard; that is, one recommended for a higher concentration of lead than is present in your workplace. For example, a powered air purifying respirator (PAPR) is much more protective than a typical negative pressure respirator, and may also be more comfortable to wear. A PAPR has a filter, cartridge or canister to clean the air, and a power source which continuously blows filtered air into your breathing zone. Your employer might make a PAPR available to you to ease the burden of having to wear a respirator for long periods of time. The standard provides that you can obtain a PAPR upon request.

Your employer must also start a Respiratory Protection Program. This program must include written procedures for the proper selection, use, cleaning, storage, and maintenance of respirator.

Your employer must assure that your respirator facepiece fits properly. Proper fit of a respirator facepiece is critical. Obtaining a proper fit on each employee may require your employer to make available two or three different mask types. In order to assure that your respirator fits properly and that facepiece leakage is minimized, your employer must give you either a qualitative fit test or a quantitative fit test (if you use a negative pressure respirator) in accordance with appendix D. Any respirator which has a filter, cartridge or canister which cleans the work room air before you breathe it and which requires the force of your inhalation to draw air through the filtering element is a negative pressure respirator. A positive pressure respirator supplies air to you directly. A quantitative fit test uses a sophisticated machine to measure the amount, if any, of test material that leaks into the facepiece of your respirator.

You must also receive from your employer proper training in the use of respirator. Your employer is required to teach you how to wear a respirator, to know why it is needed, and to understand its limitations.

Your employer must test the effectiveness of your negative pressure respirator initially and at least every six months thereafter with a "qualitative fit test." In this test, the fit of the facepiece is checked by seeing if you can smell a

substance placed outside the respirator. If you can, there is appreciable leakage where the facepiece meets your face.

The standard provides that if your respirator uses filter elements, you must be given an opportunity to change the filter elements whenever an increase in breathing resistance is detected. You also must be permitted to periodically leave your work area to wash your face and respirator facepiece whenever necessary to prevent skin irritation. If you ever have difficulty in breathing during a fit test or while using a respirator, your employer must make a medical examination available to you to determine whether you can safely wear a respirator. The result of this examination may be to give you a positive pressure respirator (which reduces breathing resistance) or to provide alternative means of protection.

(5) Protective work clothing and equipment—WAC 296-155-17615.

If you are exposed to lead above the PEL as an 8-hour TWA, without regard to your use of a respirator, or if you are exposed to lead compounds such as lead arsenate or lead azide which can cause skin and eye irritation, your employer must provide you with protective work clothing and equipment appropriate for the hazard. If work clothing is provided, it must be provided in a clean and dry condition at least weekly, and daily if your airborne exposure to lead is greater than 200 µg/m³. Appropriate protective work clothing and equipment can include coveralls or similar full-body work clothing, gloves, hats, shoes or disposable shoe coverlets, and face shields or vented goggles. Your employer is required to provide all such equipment at no cost to you. In addition, your employer is responsible for providing repairs and replacement as necessary, and also is responsible for the cleaning, laundering or disposal of protective clothing and equipment.

The standard requires that your employer assure that you follow good work practices when you are working in areas where your exposure to lead may exceed the PEL. With respect to protective clothing and equipment, where appropriate, the following procedures should be observed prior to beginning work:

- ◆ Change into work clothing and shoe covers in the clean section of the designated changing areas;
- ◆ Use work garments of appropriate protective gear, including respirator before entering the work area; and
- ◆ Store any clothing not worn under protective clothing in the designated changing area.

Workers should follow these procedures upon leaving the work area:

- ◆ HEPA vacuum heavily contaminated protective work clothing while it is still being worn. At no time may lead be removed from protective clothing by any means which result in uncontrolled dispersal of lead into the air;
- ◆ Remove shoe covers and leave them in the work area;
- ◆ Remove protective clothing and gear in the dirty area of the designated changing area. Remove protective coveralls by carefully rolling down the garment to reduce exposure to dust.
- ◆ Remove respirator last; and
- ◆ Wash hands and face.

Workers should follow these procedures upon finishing work for the day (in addition to procedures described above):

- ◆ Where applicable, place disposal coveralls and shoe covers with the abatement waste;
- ◆ Contaminated clothing which is to be cleaned, laundered or disposed of must be placed in closed containers in the change room.
- ◆ Clean protective gear, including respirator, according to standard procedures;
- ◆ Wash hands and face again.

If showers are available, take a shower and wash hair. If shower facilities are not available at the work site, shower immediately at home and wash hair.

(6) Housekeeping—WAC 296-155-17617.

Your employer must establish a housekeeping program sufficient to maintain all surfaces as free as practicable of accumulations of lead dust. Vacuuming is the preferred method of meeting this requirement, and the use of compressed air to clean floors and other surfaces is generally prohibited unless removal with compressed air is done in conjunction with ventilation systems designed to contain dispersal of the lead dust. Dry or wet sweeping, shoveling, or brushing may not be used except where vacuuming or other equally effective methods have been tried and do not work. Vacuums must be used equipped with a special filter called a high-efficiency particulate air (HEPA) filter and emptied in a manner which minimizes the reentry of lead into the workplace.

(7) Hygiene facilities and practices—WAC 296-155-17619.

The standard requires that hand washing facilities be provided where occupational exposure to lead occurs. In addition, change areas, showers (where feasible), and lunchrooms or eating areas are to be made available to workers exposed to lead above the PEL. Your employer must assure that except in these facilities, food and beverage is not present or consumed, tobacco products are not present or used, and cosmetics are not applied, where airborne exposures are above the PEL. Change rooms provided by your employer must be equipped with separate storage facilities for your protective clothing and equipment and street clothes to avoid cross-contamination. After showering, no required protective clothing or equipment worn during the shift may be worn home. It is important that contaminated clothing or equipment be removed in change areas and not be worn home or you will extend your exposure and expose your family since lead from your clothing can accumulate in your house, car, etc.

Lunchrooms or eating areas may not be entered with protective clothing or equipment unless surface dust has been removed by vacuuming, downdraft booth, or other cleaning method. Finally, workers exposed above the PEL must wash both their hands and faces prior to eating, drinking, smoking or applying cosmetics.

All of the facilities and hygiene practices just discussed are essential to minimize additional sources of lead absorption from inhalation or ingestion of lead that may accumulate on you, your clothes, or your possessions. Strict compliance with these provisions can virtually eliminate several sources of lead exposure which significantly contribute to excessive lead absorption.

(8) Medical surveillance—WAC 296-155-17621.

The medical surveillance program is part of the standard's comprehensive approach to the prevention of lead-related disease. Its purpose is to supplement the main thrust of the standard which is aimed at minimizing airborne concentrations of lead and sources of ingestion. Only medical surveillance can determine if the other provisions of the standard have affectively protected you as an individual. Compliance with the standard's provision will protect most workers from the adverse effects of lead exposure, but may not be satisfactory to protect individual workers:

- ◆ Who have high body burdens of lead acquired over past years,
- ◆ Who have additional uncontrolled sources of non-occupational lead exposure,
- ◆ Who exhibit unusual variations in lead absorption rates, or
- ◆ Who have specific non-work related medical conditions which could be aggravated by lead exposure (e.g., renal disease, anemia).

In addition, control systems may fail, or hygiene and respirator programs may be inadequate. Periodic medical surveillance of individual workers will help detect those failures. Medical surveillance will also be important to protect your reproductive ability—regardless of whether you are a man or woman.

All medical surveillance required by the standard must be performed by or under the supervision of a licensed physician. The employer must provide required medical surveillance without cost to employees and at a reasonable time and place. The standard's medical surveillance program has two parts—periodic biological monitoring and medical examinations. Your employer's obligation to offer you medical surveillance is triggered by the results of the air monitoring program. Full medical surveillance must be made available to all employees who are or may be exposed to lead in excess of the action level for more than 30 days a year and whose blood lead level exceeds 40 µg/dl. Initial medical surveillance consisting of blood sampling and analysis for lead and zinc protoporphyrin must be provided to all employees exposed at any time (1 day) above the action level.

Biological monitoring under the standard must be provided at least every 2 months for the first 6 months and every 6 months thereafter until your blood lead level is below 40 µg/dl. A zinc protoporphyrin (ZPP) test is a very useful blood test which measures an adverse metabolic effect of lead on your body and is therefore an indicator of lead toxicity.

If your BLL exceeds 40 µg/dl the monitoring frequency must be increased from every 6 months to at least every 2 months and not reduced until two consecutive BLLs indicate a blood lead level below 40 µg/dl. Each time your BLL is determined to be over 40 µg/dl, your employer must notify you of this in writing within five working days of their receipt of the test results. The employer must also inform you that the standard requires temporary medical removal with economic protection when your BLL exceeds 50 µg/dl. (See Discussion of medical removal protection—WAC 296-155-17623.) Anytime your BLL exceeds 50 µg/dl your employer must make available to you within two weeks of receipt of these test results a second follow-up BLL test to confirm your BLL. If the two tests both exceed 50 µg/dl,

and you are temporarily removed, then your employer must make successive BLL tests available to you on a monthly basis during the period of your removal.

Medical examinations beyond the initial one must be made available on an annual basis if your blood lead level exceeds 40 µg/dl at any time during the preceding year and you are being exposed above the airborne action level of 30 µg/m³ for 30 or more days per year. The initial examination will provide information to establish a baseline to which subsequent data can be compared.

An initial medical examination to consist of blood sampling and analysis for lead and zinc protoporphyrin must also be made available (prior to assignment) for each employee being assigned for the first time to an area where the airborne concentration of lead equals or exceeds the action level at any time. In addition, a medical examination or consultation must be made available as soon as possible if you notify your employer that you are experiencing signs or symptoms commonly associated with lead poisoning or that you have difficulty breathing while wearing a respirator or during a respirator fit test. You must also be provided a medical examination or consultation if you notify your employer that you desire medical advice concerning the effects of current or past exposure to lead on your ability to procreate a healthy child.

Finally, appropriate follow-up medical examinations or consultations may also be provided for employees who have been temporarily removed from exposure under the medical removal protection provisions of the standard. (See subsection (9), below.)

The standard specifies the minimum content of pre-assignment and annual medical examinations. The content of other types of medical examinations and consultations is left up to the sound discretion of the examining physician. Preassignment and annual medical examinations must include:

- ◆ A detailed work history and medical history;
- ◆ A thorough physical examination, including an evaluation of your pulmonary status if you will be required to use a respirator;
- ◆ A blood pressure measurement; and
- ◆ A series of laboratory tests designed to check your blood chemistry and your kidney function.

In addition, at any time upon your request, a laboratory evaluation of male fertility will be made (microscopic examination of a sperm sample), or a pregnancy test will be given.

The standard does not require that you participate in any of the medical procedures, tests, etc. which your employer is required to make available to you. Medical surveillance can, however, play a very important role in protecting your health. You are strongly encouraged, therefore, to participate in a meaningful fashion. The standard contains a multiple physician review mechanism which will give you a chance to have a physician of your choice directly participate in the medical surveillance program. If you are dissatisfied with an examination by a physician chosen by your employer, you can select a second physician to conduct an independent analysis. The two doctors would attempt to resolve any differences of opinion, and select a third physician to resolve any firm dispute. Generally your employer will choose the physician who conducts medical surveillance under the lead

standard-unless you and your employer can agree on the choice of a physician or physicians. Some companies and unions have agreed in advance, for example, to use certain independent medical laboratories or panels of physicians. Any of these arrangements are acceptable so long as required medical surveillance is made available to workers.

The standard requires your employer to provide certain information to a physician to aid in their examination of you. This information includes:

- ◆ The standard and its appendices,
- ◆ A description of your duties as they relate to occupational lead exposure,
- ◆ Your exposure level or anticipated exposure level,
- ◆ A description of any personal protective equipment you wear,
- ◆ Prior blood lead level results, and
- ◆ Prior written medical opinions concerning you that the employer has.

After a medical examination or consultation the physician must prepare a written report which must contain:

- ◆ The physician's opinion as to whether you have any medical condition which places you at increased risk of material impairment to health from exposure to lead,
- ◆ Any recommended special protective measures to be provided to you,
- ◆ Any blood lead level determinations, and
- ◆ Any recommended limitation on your use of respirator.

This last element must include a determination of whether you can wear a powered air purifying respirator (PAPR) if you are found unable to wear a negative pressure respirator.

The medical surveillance program of the lead standard may at some point in time serve to notify certain workers that they have acquired a disease or other adverse medical condition as a result of occupational lead exposure. If this is true, these workers might have legal rights to compensation from public agencies, their employers, firms that supply hazardous products to their employers, or other persons. Some states have laws, including worker compensation laws, that disallow a worker who learns of a job-related health impairment to sue, unless the worker sues within a short period of time after learning of the impairment. (This period of time may be a matter of months or years.) An attorney can be consulted about these possibilities. It should be stressed that WISHA is in no way trying to either encourage or discourage claims or lawsuits. However, since results of the standard's medical surveillance program can significantly affect the legal remedies of a worker who has acquired a job-related disease or impairment, it is proper for WISHA to make you aware of this.

The medical surveillance section of the standard also contains provisions dealing with chelation. Chelation is the use of certain drugs (administered in pill form or injected into the body) to reduce the amount of lead absorbed in body tissues. Experience accumulated by the medical and scientific communities has largely confirmed the effectiveness of this type of therapy for the treatment of very severe lead poisoning. On the other hand, it has also been established that there can be a long list of extremely harmful side effects associated with the use of chelating agents. The

medical community has balanced the advantages and disadvantages resulting from the use of chelating agents in various circumstances and has established when the use of these agents is acceptable. The standard includes these accepted limitations due to a history of abuse of chelation therapy by some lead companies. The most widely used chelating agents are calcium disodium EDTA, (Ca Na₂ EDTA), Calcium Disodium Versenate (Versenate), and d-penicillamine (penicillamine or Cupramine).

The standard prohibits "prophylactic chelation" of any employee by any person the employer retains, supervises or controls. "Prophylactic chelation" is the routine use of chelating or similarly acting drugs to prevent elevated blood levels in workers who are occupationally exposed to lead, or the use of these drugs to routinely lower blood lead levels to predesignated concentrations believed to be "safe". It should be emphasized that where an employer takes a worker who has no symptoms of lead poisoning and has chelation carried out by a physician (either inside or outside of a hospital) solely to reduce the worker's blood lead level, that will generally be considered prophylactic chelation. The use of a hospital and a physician does not mean that prophylactic chelation is not being performed. Routine chelation to prevent increased or reduce current blood lead levels is unacceptable whatever the setting.

The standard allows the use of "therapeutic" or "diagnostic" chelation if administered under the supervision of a licensed physician in a clinical setting with thorough and appropriate medical monitoring. Therapeutic chelation responds to severe lead poisoning where there are marked symptoms. Diagnostic chelation involved giving a patient a dose of the drug then collecting all urine excreted for some period of time as an aid to the diagnosis of lead poisoning.

In cases where the examining physician determines that chelation is appropriate, you must be notified in writing of this fact before such treatment. This will inform you of a potentially harmful treatment, and allow you to obtain a second opinion.

(9) Medical removal protection—WAC 296-155-17623.

Excessive lead absorption subjects you to increased risk of disease. Medical removal protection (MRP) is a means of protecting you when, for whatever reasons, other methods, such as engineering controls, work practices, and respirator, have failed to provide the protection you need. MRP involves the temporary removal of a worker from their regular job to a place of significantly lower exposure without any loss of earnings, seniority, or other employment rights or benefits. The purpose of this program is to cease further lead absorption and allow your body to naturally excrete lead which has previously been absorbed. Temporary medical removal can result from an elevated blood lead level, or a medical opinion. For up to 18 months, or for as long as the job the employee was removed from lasts, protection is provided as a result of either form of removal. The vast majority of removed workers, however, will return to their former jobs long before this eighteen month period expires.

You may also be removed from exposure even if your blood lead level is below 50 µg/dl if a final medical determination indicates that you temporarily need reduced lead exposure for medical reasons. If the physician who is implementing your employers medical program makes a final written opinion recommending your removal or other special

protective measures, your employer must implement the physician's recommendation. If you are removed in this manner, you may only be returned when the doctor indicates that it is safe for you to do so.

The standard does not give specific instructions dealing with what an employer must do with a removed worker. Your job assignment upon removal is a matter for you, your employer and your union (if any) to work out consistent with existing procedures for job assignments. Each removal must be accomplished in a manner consistent with existing collective bargaining relationships. Your employer is given broad discretion to implement temporary removals so long as no attempt is made to override existing agreements. Similarly, a removed worker is provided no right to veto an employer's choice which satisfies the standard.

In most cases, employers will likely transfer removed employees to other jobs with sufficiently low lead exposure. Alternatively, a worker's hours may be reduced so that the time weighted average exposure is reduced, or they may be temporarily laid off if no other alternative is feasible.

In all of these situations, MRP benefits must be provided during the period of removal—i.e., you continue to receive the same earnings, seniority, and other rights and benefits you would have had if you had not been removed. Earnings includes more than just your base wage; it includes overtime, shift differentials, incentives, and other compensation you would have earned if you had not been removed. During the period of removal you must also be provided with appropriate follow-up medical surveillance. If you were removed because your blood lead level was too high, you must be provided with a monthly blood test. If a medical opinion caused your removal, you must be provided medical tests or examinations that the doctor believes to be appropriate. If you do not participate in this follow up medical surveillance, you may lose your eligibility for MRP benefits.

When you are medically eligible to return to your former job, your employer must return you to your "former job status." This means that you are entitled to the position, wages, benefits, etc., you would have had if you had not been removed. If you would still be in your old job if no removal had occurred that is where you go back. If not, you are returned consistent with whatever job assignment discretion your employer would have had if no removal had occurred. MRP only seeks to maintain your rights, not expand them or diminish them.

If you are removed under MRP and you are also eligible for worker compensation or other compensation for lost wages, your employer's MRP benefits obligation is reduced by the amount that you actually receive from these other sources. This is also true if you obtain other employment during the time you are laid off with MRP benefits.

The standard also covers situations where an employer voluntarily removes a worker from exposure to lead due to the effects of lead on the employee's medical condition, even though the standard does not require removal. In these situations MRP benefits must still be provided as though the standard required removal. Finally, it is important to note that in all cases where removal is required, respirator cannot be used as a substitute. Respirator may be used before removal becomes necessary, but not as an alternative to a transfer to a low exposure job, or to a lay-off with MRP benefits.

(1997 Ed.)

(10) Employee information and training—WAC 296-155-17625.

Your employer is required to provide an information and training program for all employees exposed to lead above the action level or who may suffer skin or eye irritation from lead compounds such as lead arsenate or lead azide. The program must train these employees regarding the specific hazards associated with their work environment, protective measures which can be taken, including the contents of any compliance plan in effect, the danger of lead to their bodies (including their reproductive systems), and their rights under the standard. All employees must be trained prior to initial assignment to areas where there is a possibility of exposure over the action level.

This training program must also be provided at least annually thereafter unless further exposure above the action level will not occur.

(11) Signs—WAC 296-155-17627.

The standard requires that the following warning sign be posted in work areas where the exposure to lead exceeds the PEL:

WARNING
LEAD WORK AREA
POISON
NO SMOKING OR EATING

These signs are to be posted and maintained in a manner which assures that the legend is readily visible.

(12) Recordkeeping—WAC 296-155-17629.

Your employer is required to keep all records of exposure monitoring for airborne lead. These records must include the name and job classification of employees measured, details of the sampling and analytical techniques, the results of this sampling, and the type of respiratory protection being worn by the person sampled. Such records are to be retained for at least 30 years. Your employer is also required to keep all records of biological monitoring and medical examination results. These records must include the names of the employees, the physician's written opinion, and a copy of the results of the examination. Medical records must be preserved and maintained for the duration of employment plus 30 years. However, if the employee's duration of employment is less than one year, the employer need not retain that employee's medical records beyond the period of employment if they are provided to the employee upon termination of employment.

Recordkeeping is also required if you are temporarily removed from your job under the medical removal protection program. This record must include your name and Social Security number, the date of your removal and return, how the removal was or is being accomplished, and whether or not the reason for the removal was an elevated blood lead level. Your employer is required to keep each medical removal record only for as long as the duration of an employee's employment.

The standard requires that if you request to see or copy environmental monitoring, blood lead level monitoring, or medical removal records, they must be made available to you or to a representative that you authorize. Your union also has access to these records. Medical records other than BLL's must also be provided upon request to you, to your physician or to any other person whom you may specifically

designate. Your union does not have access to your personal medical records unless you authorize their access.

(13) Observation of monitoring—WAC 296-155-17631.

When air monitoring for lead is performed at your workplace as required by this standard, your employer must allow you or someone you designate to act as an observer of the monitoring. Observers are entitled to an explanation of the measurement procedure, and to record the results obtained. Since results will not normally be available at the time of the monitoring, observers are entitled to record or receive the results of the monitoring when returned by the laboratory. Your employer is required to provide the observer with any personal protective devices required to be worn by employees working in the area that is being monitored. The employer must require the observer to wear all such equipment and to comply with all other applicable safety and health procedures.

(14) Startup date—WAC 296-155-17635.

Employer obligations under the standard begin as of that date with full implementation of engineering controls as soon as possible but no later than within 4 months, and all other provisions completed as soon as possible, but no later than within 2 months from the effective date.

(15) For additional information.

(a) A copy of the standard for lead in construction can be obtained free of charge by calling or writing to the department of labor and industries, Post Office Box 44620, Mailstop 44620, Olympia, Washington 98504-4620: Telephone (360) 956-5527.

(b) Additional information about the standard, its enforcement, and your employer's compliance can be obtained from the nearest office listed in your telephone directory under the state of Washington, department of labor and industries.

[Statutory Authority: Chapter 49.17 RCW. 93-22-054 (Order 93-07), § 296-155-17652, filed 10/29/93, effective 12/10/93.]

WAC 296-155-17654 Appendix C to WAC 296-155-176—Medical surveillance guidelines. (1) Introduction.

The primary purpose of the Washington Industrial Safety and Health Act of 1973 is to assure, so far as possible, safe and healthful working conditions for every working man and woman. The occupational health standard for lead in construction is designed to protect workers exposed to inorganic lead including metallic lead, all inorganic lead compounds and organic lead soaps.

Under this standard occupational exposure to inorganic lead is to be limited to 50 µg/m³ (micrograms per cubic meter) based on an 8 hour time-weighted average (TWA). This permissible exposure limit (PEL) must be achieved through a combination of engineering, work practice and administrative controls to the extent feasible. Where these controls are in place but are found not to reduce employee exposures to or below the PEL, they must be used nonetheless, and supplemented with respirators to meet the 50 µg/m³ exposure limit.

The standard also provides for a program of biological monitoring for employees exposed to lead above the action level at any time, and additional medical surveillance for all employees exposed to levels of inorganic lead above 30

µg/m³ (TWA) for more than 30 days per year and whose BLL exceeds 40 µg/dl.

The purpose of this document is to outline the medical surveillance provisions of the standard for inorganic lead in construction, and to provide further information to the physician regarding the examination and evaluation of workers exposed to inorganic lead.

Subsection (2) provides a detailed description of the monitoring procedure including the required frequency of blood testing for exposed workers, provisions for medical removal protection (MRP), the recommended right of the employee to a second medical opinion, and notification and recordkeeping requirements of the employer. A discussion of the requirements for respirator use and respirator monitoring and WISHA's position on prophylactic chelation therapy are also included in this subsection.

Subsection (3) discusses the toxic effects and clinical manifestations of lead poisoning and effects of lead intoxication on enzymatic pathways in heme synthesis. The adverse effects on both male and female reproductive capacity and on the fetus are also discussed.

Subsection (4) outlines the recommended medical evaluation of the worker exposed to inorganic lead, including details of the medical history, physical examination, and recommended laboratory tests, which are based on the toxic effects of lead as discussed in subsection (3).

Subsection (5) provides detailed information concerning the laboratory tests available for the monitoring of exposed workers. Included also is a discussion of the relative value of each test and the limitations and precautions which are necessary in the interpretation of the laboratory results.

(2) Medical surveillance and monitoring requirements for workers exposed to inorganic lead.

Under the standard for inorganic lead in the construction industry, initial medical surveillance consisting of biological monitoring to include blood lead and ZPP level determination shall be provided to employees exposed to lead at or above the action level on any one day. In addition, a program of biological monitoring is to be made available to all employees exposed above the action level at any time and additional medical surveillance is to be made available to all employees exposed to lead above 30 µg/m³ TWA for more than 30 days each year and whose BLL exceeds 40 µg/dl. This program consists of periodic blood sampling and medical evaluation to be performed on a schedule which is defined by previous laboratory results, worker complaints or concerns, and the clinical assessment of the examining physician.

Under this program, the blood lead level (BLL) of all employees who are exposed to lead above 30 µg/m³ for more than 30 days per year or whose blood lead is above 40 µg/dl but exposed for no more than 30 days per year is to be determined at least every two months for the first six months of exposure and every six months thereafter. The frequency is increased to every two months for employees whose last blood lead level was 40 µg/dl or above. For employees who are removed from exposure to lead due to an elevated blood lead, a new blood lead level must be measured monthly. A zinc protoporphyrin (ZPP) measurement is strongly recommended on each occasion that a blood lead level measurement is made.

An annual medical examination and consultation performed under the guidelines discussed in subsection (4) is to be made available to each employee exposed above 30 $\mu\text{g}/\text{m}^3$ for more than 30 days per year for whom a blood test conducted at any time during the preceding 12 months indicated a blood lead level at or above 40 $\mu\text{g}/\text{dl}$. Also, an examination is to be given to all employees prior to their assignment to an area in which airborne lead concentrations reach or exceed the 30 $\mu\text{g}/\text{m}^3$ for more than 30 days per year. In addition, a medical examination must be provided as soon as possible after notification by an employee that the employee has developed signs or symptoms commonly associated with lead intoxication, that the employee desires medical advice regarding lead exposure and the ability to procreate a healthy child, or that the employee has demonstrated difficulty in breathing during a respirator fitting test or during respirator use. An examination is also to be made available to each employee removed from exposure to lead due to a risk of sustaining material impairment to health, or otherwise limited or specially protected pursuant to medical recommendations.

Results of biological monitoring or the recommendations of an examining physician may necessitate removal of an employee from further lead exposure pursuant to the standard's medical removal protection (MRP) program. The object of the MRP program is to provide temporary medical removal to workers either with substantially elevated blood lead levels or otherwise at risk of sustaining material health impairment from continued substantial exposure to lead.

Under the standard's ultimate worker removal criteria, a worker is to be removed from any work having an eight hour TWA exposure to lead of 30 $\mu\text{g}/\text{m}^3$ when their blood lead level reaches 50 $\mu\text{g}/\text{dl}$ and is confirmed by a second follow-up blood lead level performed within two weeks after the employer receives the results of the first blood sampling test. Return of the employee to their job status depends on a worker's blood lead level declining to 40 $\mu\text{g}/\text{dl}$.

As part of the standard, the employer is required to notify in writing each employee whose blood lead level exceeds 40 $\mu\text{g}/\text{dl}$. In addition each such employee is to be informed that the standard requires medical removal with MRP benefits, discussed below, when an employee's blood lead level exceeds the above defined limit.

In addition to the above blood lead level criterion, temporary worker removal may also take place as a result of medical determinations and recommendations. Written medical opinions must be prepared after each examination pursuant to the standard. If the examining physician includes a medical finding, determination or opinion that the employee has a medical condition which places the employee at increased risk of material health impairment from exposure to lead, then the employee must be removed from exposure to lead at or above 30 $\mu\text{g}/\text{m}^3$. Alternatively, if the examining physician recommends special protective measures for an employee (e.g., use of a powered air purifying respirator) or recommends limitations on an employee's exposure to lead, then the employer must implement these recommendations.

Recommendations may be more stringent than the specific provisions of the standard. The examining physician, therefore, is given broad flexibility to tailor special protective procedures to the needs of individual employees.

This flexibility extends to the evaluation and management of pregnant workers and male and female workers who are planning to raise children. Based on the history, physical examination, and laboratory studies, the physician might recommend special protective measures or medical removal for an employee who is pregnant or who is planning to conceive a child when, in the physician's judgment, continued exposure to lead at the current job would pose a significant risk. The return of the employee to their former job status, or the removal of special protections or limitations, depends upon the examining physician determining that the employee is no longer at increased risk of material impairment or that special measures are no longer needed.

During the period of any form of special protection or removal, the employer must maintain the worker's earnings, seniority, and other employment rights and benefits (as though the worker had not been removed) for a period of up to 18 months or for as long as the job the employee was removed from lasts if less than 18 months. This economic protection will maximize meaningful worker participation in the medical surveillance program, and is appropriate as part of the employer's overall obligation to provide a safe and healthful workplace. The provisions of MRP benefits during the employee's removal period may, however, be conditioned upon participation in medical surveillance.

The lead standard provides for a multiple physician review in cases where the employee wishes a second opinion concerning potential lead poisoning or toxicity. If an employee wishes a second opinion, they can make an appointment with a physician of their choice. This second physician will review the findings, recommendations or determinations of the first physician and conduct any examinations, consultations or tests deemed necessary in an attempt to make a final medical determination. If the first and second physicians do not agree in their assessment they must try to resolve their differences. If they cannot reach an agreement then they must designate a third physician to resolve the dispute.

The employer must provide examining and consulting physicians with the following specific information: A copy of the lead regulations and all appendices, a description of the employee's duties as related to exposure, the exposure level or anticipated level to lead and any other toxic substances (if applicable), a description of personal protective equipment used, blood lead levels, and all prior written medical opinions regarding the employee in the employer's possession or control. The employer must also obtain from the physician and provide the employee with a written medical opinion containing blood lead levels, the physicians's opinion as to whether the employee is at risk of material impairment to health, any recommended protective measures for the employee if further exposure is permitted, as well as any recommended limitations upon an employee's use of respirators.

Employers must instruct each physician not to reveal to the employer in writing or in any other way their findings, laboratory results, or diagnoses which are felt to be unrelated to occupational lead exposure. They must also instruct each physician to advise the employee of any occupationally or non-occupationally related medical condition requiring further treatment or evaluation.

The standard provides for the use of respirators where engineering and other primary controls are not effective. However, the use of respirator protection shall not be used in lieu of temporary medical removal due to elevated blood lead levels or findings that an employee is at risk of material health impairment. This is based on the numerous inadequacies of respirators including skin rash where the facepiece makes contact with the skin, unacceptable stress to breathing in some workers with underlying cardiopulmonary impairment, difficulty in providing adequate fit, the tendency for respirators to create additional hazards by interfering with vision, hearing, and mobility, and the difficulties of assuring the maximum effectiveness of a complicated work practice program involving respirators. Respirators do, however, serve a useful function where engineering and work practice controls are inadequate by providing supplementary, interim, or short-term protection, provided they are properly selected for the environment in which the employee will be working, properly fitted to the employee, maintained and cleaned periodically, and worn by the employee when required.

In its standard on occupational exposure to inorganic lead in the construction industry, WISHA has prohibited prophylactic chelation. Diagnostic and therapeutic chelation are permitted only under the supervision of a licensed physician with appropriate medical monitoring in an acceptable clinical setting. The decision to initiate chelation therapy must be made on an individual basis and take into account the severity of symptoms felt to be a result of lead toxicity along with blood lead levels, ZPP levels, and other laboratory tests as appropriate. EDTA and penicillamine which are the primary chelating agents used in the therapy of occupational lead poisoning have significant potential side effects and their use must be justified on the basis of expected benefits to the worker. Unless frank and severe symptoms are present, therapeutic chelation is not recommended, given the opportunity to remove a worker from exposure and allow the body to naturally excrete accumulated lead. As a diagnostic aid, the chelation mobilization test using CA-EDTA has limited applicability. According to some investigators, the test can differentiate between lead-induced and other nephropathies. The test may also provide an estimation of the mobile fraction of the total body lead burden.

Employers are required to assure that accurate records are maintained on exposure assessment, including environmental monitoring, medical surveillance, and medical removal for each employee. Exposure assessment records must be kept for at least 30 years. Medical surveillance records must be kept for the duration of employment plus 30 years except in cases where the employment was less than one year. If duration of employment is less than one year, the employer need not retain this record beyond the term of employment if the record is provided to the employee upon termination of employment. Medical removal records also must be maintained for the duration of employment. All records required under the standard must be made available upon request to the director. Employers must also make environmental and biological monitoring and medical removal records available to affected employees and to former employees or their authorized employee representatives. Employees or their specifically designated representatives have access to their entire medical surveillance records.

In addition, the standard requires that the employer inform all workers exposed to lead at or above $30 \mu\text{g}/\text{m}^3$ of the provisions of the standard and all its appendices, the purpose and description of medical surveillance and provisions for medical removal protection if temporary removal is required. An understanding of the potential health effects of lead exposure by all exposed employees along with full understanding of their rights under the lead standard is essential for an effective monitoring program.

(3) Adverse health effects of inorganic lead.

Although the toxicity of lead has been known for 2,000 years, the knowledge of the complex relationship between lead exposure and human response is still being refined. Significant research into the toxic properties of lead continues throughout the world, and it should be anticipated that our understanding of thresholds of effects and margins of safety will be improved in future years. The provisions of the lead standard are founded on two prime medical judgments: First, the prevention of adverse health effects from exposure to lead throughout a working lifetime requires that worker blood lead levels be maintained at or below $40 \mu\text{g}/\text{dl}$ and second, the blood lead levels of workers, male or female, who intend to parent in the near future should be maintained below $30 \mu\text{g}/\text{dl}$ to minimize adverse reproductive health effects to the parents and developing fetus. The adverse effects of lead on reproduction are being actively researched and WISHA encourages the physician to remain abreast of recent developments in the area to best advise pregnant workers or workers planning to conceive children.

The spectrum of health effects caused by lead exposure can be subdivided into five developmental stages: Normal, physiological changes of uncertain significance, pathophysiological changes, overt symptoms (morbidity), and mortality. Within this process there are no sharp distinctions, but rather a continuum of effects. Boundaries between categories overlap due to the wide variation of individual responses and exposures in the working population. WISHA's development of the lead standard focused on pathophysiological changes as well as later stages of disease.

(a) Heme synthesis inhibition. The earliest demonstrated effect of lead involves its ability to inhibit at least two enzymes of the heme synthesis pathway at very low blood levels. Inhibition of delta aminolevulinic acid dehydrase (ALA-D) which catalyzes the conversion of delta-aminolevulinic acid (ALA) to protoporphyrin is observed at a blood lead level below $20 \mu\text{g}/\text{dl}$. At a blood lead level of $40 \mu\text{g}/\text{dl}$, more than 20% of the population would have 70% inhibition of ALA-D. There is an exponential increase in ALA excretion at blood lead levels greater than $40 \mu\text{g}/\text{dl}$.

Another enzyme, ferrochelatase, is also inhibited at low blood lead levels. Inhibition of ferrochelatase leads to increased free erythrocyte protoporphyrin (FEP) in the blood which can then bind to zinc to yield zinc protoporphyrin. At a blood lead level of $50 \mu\text{g}/\text{dl}$ or greater, nearly 100% of the population will have an increase in FEP. There is also an exponential relationship between blood lead levels greater than $40 \mu\text{g}/\text{dl}$ and the associated ZPP level, which has led to the development of the ZPP screening test for lead exposure.

While the significance of these effects is subject to debate, it is WISHA's position that these enzyme disturbances are early stages of a disease process which may eventually result in the clinical symptoms of lead poisoning.

Whether or not the effects do progress to the later stages of clinical disease, disruption of these enzyme processes over a working lifetime is considered to be a material impairment of health.

One of the eventual results of lead-induced inhibition of enzymes in the heme synthesis pathway is anemia which can be asymptomatic if mild but associated with a wide array of symptoms including dizziness, fatigue, and tachycardia when more severe. Studies have indicated that lead levels as low as 50 $\mu\text{g}/\text{dl}$ can be associated with a definite decreased hemoglobin, although most cases of lead-induced anemia, as well as shortened red-cell survival times, occur at lead levels exceeding 80 $\mu\text{g}/\text{dl}$. Inhibited hemoglobin synthesis is more common in chronic cases whereas shortened erythrocyte life span is more common in acute cases.

In lead-induced anemias, there is usually a reticulocytosis along with the presence of basophilic stippling, and ringed sideroblasts, although none of the above are pathognomonic for lead-induced anemia.

(b) Neurological effects. Inorganic lead has been found to have toxic effects on both the central and peripheral nervous systems. The earliest stages of lead-induced central nervous system effects first manifest themselves in the form of behavioral disturbances and central nervous system symptoms including irritability, restlessness, insomnia and other sleep disturbances, fatigue, vertigo, headache, poor memory, tremor, depression, and apathy. With more severe exposure, symptoms can progress to drowsiness, stupor, hallucinations, delirium, convulsions and coma.

The most severe and acute form of lead poisoning which usually follows ingestion or inhalation of large amounts of lead is acute encephalopathy which may arise precipitously with the onset of intractable seizures, coma, cardiorespiratory arrest, and death within 48 hours.

While there is disagreement about what exposure levels are needed to produce the earliest symptoms, most experts agree that symptoms definitely can occur at blood lead levels of 60 $\mu\text{g}/\text{dl}$ whole blood and therefore recommend a 40 $\mu\text{g}/\text{dl}$ maximum. The central nervous system effects frequently are not reversible following discontinued exposure or chelation therapy and when improvement does occur, it is almost always only partial.

The peripheral neuropathy resulting from lead exposure characteristically involves only motor function with minimal sensory damage and has a marked predilection for the extensor muscles of the most active extremity. The peripheral neuropathy can occur with varying degrees of severity. The earliest and mildest form which can be detected in workers with blood lead levels as low as 50 $\mu\text{g}/\text{dl}$ is manifested by slowing of motor nerve conduction velocity often without clinical symptoms. With progression of the neuropathy there is development of painless extensor muscle weakness usually involving the extensor muscles of the fingers and hand in the most active upper extremity, followed in severe cases by wrist drop or, much less commonly, foot drop.

In addition to slowing of nerve conduction, electromyographical studies in patients with blood lead levels greater than 50 $\mu\text{g}/\text{dl}$ have demonstrated a decrease in the number of acting motor unit potentials, an increase in the duration of motor unit potentials, and spontaneous pathological activity

including fibrillations and fasciculations. Whether these effects occur at levels of 40 $\mu\text{g}/\text{dl}$ is undetermined.

While the peripheral neuropathies can occasionally be reversed with therapy, again such recovery is not assured particularly in the more severe neuropathies and often improvement is only partial. The lack of reversibility is felt to be due in part to segmental demyelination.

(c) Gastrointestinal. Lead may also affect the gastrointestinal system producing abdominal colic or diffuse abdominal pain, constipation, obstipation, diarrhea, anorexia, nausea and vomiting. Lead colic rarely develops at blood lead levels below 80 $\mu\text{g}/\text{dl}$.

(d) Renal. Renal toxicity represents one of the most serious health effects of lead poisoning. In the early stages of disease nuclear inclusion bodies can frequently be identified in proximal renal tubular cells. Renal function remains normal and the changes in this stage are probably reversible. With more advanced disease there is progressive interstitial fibrosis and impaired renal function. Eventually extensive interstitial fibrosis ensues with sclerotic glomeruli and dilated and atrophied proximal tubules; all represent end stage kidney disease. Azotemia can be progressive, eventually resulting in frank uremia necessitating dialysis. There is occasionally associated hypertension and hyperuricemia with or without gout.

Early kidney disease is difficult to detect. The urinalysis is normal in early lead nephropathy and the blood urea nitrogen and serum creatinine increase only when two-thirds of kidney function is lost. Measurement of creatinine clearance can often detect earlier disease as can other methods of measurement of glomerular filtration rate. An abnormal Ca-EDTA mobilization test has been used to differentiate between lead-induced and other nephropathies, but this procedure is not widely accepted. A form of Fanconi syndrome with aminoaciduria, glycosuria, and hyperphosphaturia indicating severe injury to the proximal renal tubules is occasionally seen in children.

(e) Reproductive effects. Exposure to lead can have serious effects on reproductive function in both males and females. In male workers exposed to lead there can be a decrease in sexual drive, impotence, decreased ability to produce healthy sperm, and sterility. Malformed sperm (teratospermia), decreased number of sperm (hypospermia), and sperm with decreased motility (asthenospermia) can all occur. Teratospermia has been noted at mean blood lead levels of 53 $\mu\text{g}/\text{dl}$ and hypospermia and asthenospermia at 41 $\mu\text{g}/\text{dl}$. Furthermore, there appears to be a dose-response relationship for teratospermia in lead exposed workers.

Women exposed to lead may experience menstrual disturbances including dysmenorrhea, menorrhagia and amenorrhea. Following exposure to lead, women have a higher frequency of sterility, premature births, spontaneous miscarriages, and stillbirths.

Germ cells can be affected by lead and cause genetic damage in the egg or sperm cells before conception and result in failure to implant, miscarriage, stillbirth, or birth defects.

Infants of mothers with lead poisoning have a higher mortality during the first year and suffer from lowered birth weights, slower growth, and nervous system disorders.

Lead can pass through the placental barrier and lead levels in the mother's blood are comparable to concentra-

tions of lead in the umbilical cord at birth. Transplacental passage becomes detectable at 12-14 weeks of gestation and increases until birth.

There is little direct data on damage to the fetus from exposure to lead but it is generally assumed that the fetus and newborn would be at least as susceptible to neurological damage as young children. Blood lead levels of 50-60 µg/dl in children can cause significant neurobehavioral impairments and there is evidence of hyperactivity at blood levels as low as 25 µg/dl. Given the overall body of literature concerning the adverse health effects of lead in children, WISHA feels that the blood lead level in children should be maintained below 30 µg/dl with a population mean of 15 µg/dl. Blood lead levels in the fetus and newborn likewise should not exceed 30 µg/dl.

Because of lead's ability to pass through the placental barrier and also because of the demonstrated adverse effects of lead on reproductive function in both the male and female as well as the risk of genetic damage of lead on both the ovum and sperm, WISHA recommends a 30 µg/dl maximum permissible blood lead level in both males and females who wish to bear children.

(f) Other toxic effects. Debate and research continue on the effects of lead on the human body. Hypertension has frequently been noted in occupationally exposed individuals although it is difficult to assess whether this is due to lead's adverse effects on the kidney or if some other mechanism is involved. Vascular and electrocardiographic changes have been detected but have not been well characterized. Lead is thought to impair thyroid function and interfere with the pituitary-adrenal axis, but again these effects have not been well defined.

(4) Medical evaluation.

The most important principle in evaluating a worker for any occupational disease including lead poisoning is a high index of suspicion on the part of the examining physician. As discussed in section (3), lead can affect numerous organ systems and produce a wide array of signs and symptoms, most of which are non-specific and subtle in nature at least in the early stages of disease. Unless serious concern for lead toxicity is present, many of the early clues to diagnosis may easily be overlooked.

The crucial initial step in the medical evaluation is recognizing that a worker's employment can result in exposure to lead. The worker will frequently be able to define exposures to lead and lead containing materials but often will not volunteer this information unless specifically asked. In other situations the worker may not know of any exposures to lead but the suspicion might be raised on the part of the physician because of the industry or occupation of the worker. Potential occupational exposure to lead and its compounds occur in many occupations in the construction industry, including demolition and salvaging operations, removal or encapsulation of materials containing lead, construction, alteration, repair or renovation of structures containing lead, transportation, disposal, storage or containment of lead or lead-containing materials on construction sites, and maintenance operations associated with construction activities.

Once the possibility for lead exposure is raised, the focus can then be directed toward eliciting information from

the medical history, physical exam, and finally from laboratory data to evaluate the worker for potential lead toxicity.

A complete and detailed work history is important in the initial evaluation. A listing of all previous employment with information on job description, exposure to fumes or dust, known exposures to lead or other toxic substances, a description of any personal protective equipment used, and previous medical surveillance should all be included in the worker's record. Where exposure to lead is suspected, information concerning on-the-job personal hygiene, smoking or eating habits in work areas, laundry procedures, and use of any protective clothing or respiratory protection equipment should be noted. A complete work history is essential in the medical evaluation of a worker with suspected lead toxicity, especially when long term effects such as neurotoxicity and nephrotoxicity are considered.

The medical history is also of fundamental importance and should include a listing of all past and current medical conditions, current medications including proprietary drug intake, previous surgeries and hospitalizations, allergies, smoking history, alcohol consumption, and also non-occupational lead exposures such as hobbies (hunting, riflery). Also known childhood exposures should be elicited. Any previous history of hematological, neurological, gastrointestinal, renal, psychological, gynecological, genetic, or reproductive problems should be specifically noted.

A careful and complete review of systems must be performed to assess both recognized complaints and subtle or slowly acquired symptoms which the worker might not appreciate as being significant. The review of symptoms should include the following:

- ♦ General—weight loss, fatigue, decreased appetite.
- ♦ Head, eyes, ears, nose, throat (HEENT)—headaches, visual disturbances or decreased visual acuity, hearing deficits or tinnitus, pigmentation of the oral mucosa, or metallic taste in mouth.
- ♦ Cardio-pulmonary—shortness of breath, cough, chest pains, palpitations, or orthopnea.
- ♦ Gastrointestinal—nausea, vomiting, heartburn, abdominal pain, constipation or diarrhea.
- ♦ Neurologic—irritability, insomnia, weakness (fatigue), dizziness, loss of memory, confusion, hallucinations, incoordination, ataxia, decreased strength in hands or feet, disturbances in gait, difficulty in climbing stairs, or seizures.
- ♦ Hematologic—pallor, easy fatigability, abnormal blood loss, melena.
- ♦ Reproductive (male and female and spouse where relevant)—history of infertility, impotence, loss of libido, abnormal menstrual periods, history of miscarriages, stillbirths, or children with birth defects.
- ♦ Musculo-skeletal—muscle and joint pains.

The physical examination should emphasize the neurological, gastrointestinal, and cardiovascular systems. The worker's weight and blood pressure should be recorded and the oral mucosa checked for pigmentation characteristic of a possible Burtonian or lead line on the gingiva. It should be noted, however, that the lead line may not be present even in severe lead poisoning if good oral hygiene is practiced.

The presence of pallor on skin examination may indicate an anemia which, if severe, might also be associated with a tachycardia. If an anemia is suspected, an active search for blood loss should be undertaken including potential blood loss through the gastrointestinal tract.

A complete neurological examination should include an adequate mental status evaluation including a search for behavioral and psychological disturbances, memory testing, evaluation for irritability, insomnia, hallucinations, and mental clouding. Gait and coordination should be examined along with close observation for tremor. A detailed evaluation of peripheral nerve function including careful sensory and motor function testing is warranted. Strength testing particularly of extensor muscle groups of all extremities is of fundamental importance.

Cranial nerve evaluation should also be included in the routine examination.

The abdominal examination should include auscultation for bowel sounds and abdominal bruits and palpation for organomegaly, masses, and diffuse abdominal tenderness.

Cardiovascular examination should evaluate possible early signs of congestive heart failure. Pulmonary status should be addressed particularly if respirator protection is contemplated.

As part of the medical evaluation, the lead standard requires the following laboratory studies:

- ◆ Blood lead level.
- ◆ Hemoglobin and hematocrit determinations, red cell indices, and examination of the peripheral blood smear to evaluate red blood cell morphology.
- ◆ Blood urea nitrogen.
- ◆ Serum creatinine.
- ◆ Routine urinalysis with microscopic examination.
- ◆ A zinc protoporphyrin level.

In addition to the above, the physician is authorized to order any further laboratory or other tests which they deem necessary in accordance with sound medical practice. The evaluation must also include pregnancy testing or laboratory evaluation of male fertility if requested by the employee. Additional tests which are probably not warranted on a routine basis but may be appropriate when blood lead and ZPP levels are equivocal include delta aminolevulinic acid and coproporphyrin concentrations in the urine, and dark-field illumination for detection of basophilic stippling in red blood cells.

If an anemia is detected further studies including a careful examination of the peripheral smear, reticulocyte count, stool for occult blood, serum iron, total iron binding capacity, bilirubin, and, if appropriate, vitamin B12 and folate may be of value in attempting to identify the cause of the anemia.

If a peripheral neuropathy is suspected, nerve conduction studies are warranted both for diagnosis and as a basis to monitor any therapy.

If renal disease is questioned, a 24 hour urine collection for creatinine clearance, protein, and electrolytes may be indicated. Elevated uric acid levels may result from lead-induced renal disease and a serum uric acid level might be performed.

An electrocardiogram and chest x-ray may be obtained as deemed appropriate.

Sophisticated and highly specialized testing should not be done routinely and where indicated should be under the direction of a specialist.

(5) Laboratory evaluation.

The blood lead level at present remains the single most important test to monitor lead exposure and is the test used in the medical surveillance program under the lead standard to guide employee medical removal. The ZPP has several advantages over the blood lead level. Because of its relatively recent development and the lack of extensive data concerning its interpretation, the ZPP currently remains an ancillary test.

This section will discuss the blood lead level and ZPP in detail and will outline their relative advantages and disadvantages. Other blood tests currently available to evaluate lead exposure will also be reviewed.

The blood lead level is a good index of current or recent lead absorption when there is no anemia present and when the worker has not taken any chelating agents. However, blood lead levels along with urinary lead levels do not necessarily indicate the total body burden of lead and are not adequate measures of past exposure. One reason for this is that lead has a high affinity for bone and up to 90% of the body's total lead is deposited there. A very important component of the total lead body burden is lead in soft tissue (liver, kidney, and brain). This fraction of the lead body burden, the biologically active lead, is not entirely reflected by blood lead levels since it is a function of the dynamics of lead absorption, distribution, deposition in bone and excretion. Following discontinuation of exposure to lead, the excess body burden is only slowly mobilized from bone and other relatively stable body stores and excreted. Consequently, a high blood lead level may only represent recent heavy exposure to lead without a significant total body excess and likewise a low blood lead level does not exclude an elevated total body burden of lead.

Also due to its correlation with recent exposures, the blood lead level may vary considerably over short time intervals.

To minimize laboratory error and erroneous results due to contamination, blood specimens must be carefully collected after thorough cleaning of the skin with appropriate methods using lead-free blood containers and analyzed by a reliable laboratory. Under the standard, samples must be analyzed in laboratories which are approved by OSHA. Analysis is to be made using atomic absorption spectrophotometry, anodic stripping voltammetry or any method which meets the accuracy requirements set forth by the standard.

The determination of lead in urine is generally considered a less reliable monitoring technique than analysis of whole blood primarily due to individual variability in urinary excretion capacity as well as the technical difficulty of obtaining accurate 24 hour urine collections. In addition, workers with renal insufficiency, whether due to lead or some other cause, may have decreased lead clearance and consequently urine lead levels may underestimate the true lead burden. Therefore, urine lead levels should not be used as a routine test.

The zinc protoporphyrin test, unlike the blood lead determination, measures an adverse metabolic effect of lead and as such is a better indicator of lead toxicity than the level of blood lead itself. The level of ZPP reflects lead

absorption over the preceding 3 to 4 months, and therefore is a better indicator of lead body burden. The ZPP requires more time than the blood lead to read significantly elevated levels; the return to normal after discontinuing lead exposure is also slower. Furthermore, the ZPP test is simpler, faster, and less expensive to perform and no contamination is possible. Many investigators believe it is the most reliable means of monitoring chronic lead absorption.

Zinc protoporphyrin results from the inhibition of the enzyme ferrochelatase which catalyzes the insertion of an iron molecule into the protoporphyrin molecule, which then becomes heme. If iron is not inserted into the molecule then zinc, having a greater affinity for protoporphyrin, takes the place of the iron, forming ZPP.

An elevation in the level of circulating ZPP may occur at blood lead levels as low as 20-30 µg/dl in some workers. Once the blood lead level has reached 40 µg/dl there is more marked rise in the ZPP value from its normal range of less than 100 µg/dl 100 ml. Increases in blood lead levels beyond 40 µg/100 g are associated with exponential increases in ZPP.

Whereas blood lead levels fluctuate over short time spans, ZPP levels remain relatively stable. ZPP is measured directly in red blood cells and is present for the cell's entire 120 day life-span. Therefore, the ZPP level in blood reflects the average ZPP production over the previous 3-4 months and consequently the average lead exposure during that time interval.

It is recommended that a hematocrit be determined whenever a confirmed ZPP of 50 µg/100 ml whole blood is obtained to rule out a significant underlying anemia. If the ZPP is in excess of 100 µg/100 ml and not associated with abnormal elevations in blood lead levels, the laboratory should be checked to be sure that blood leads were determined using atomic absorption spectrophotometry anodic stripping voltammetry, or any method which meets the accuracy requirements set forth by the standard by an OSHA approved laboratory which is experienced in lead level determinations. Repeat periodic blood lead studies should be obtained in all individuals with elevated ZPP levels to be certain that an associated elevated blood lead level has not been missed due to transient fluctuations in blood leads.

ZPP has a characteristic fluorescence spectrum with a peak at 594 nm which is detectable with a hematofluorimeter. The hematofluorimeter is accurate and portable and can provide on-site, instantaneous results for workers who can be frequently tested via a finger prick.

Careful attention must be given to calibration and quality control procedures. Limited data on blood lead-ZPP correlations and the ZPP levels which are associated with the adverse health effects discussed in subsection (3) are the major limitations of the test. Also it is difficult to correlate ZPP levels with environmental exposure and there is some variation of response with age and sex. Nevertheless, the ZPP promises to be an important diagnostic test for the early detection of lead toxicity and its value will increase as more data is collected regarding its relationship to other manifestations of lead poisoning.

Levels of delta-aminolevulinic acid (ALA) in the urine are also used as a measure of lead exposure. Increasing concentrations of ALA are believed to result from the inhibition of the enzyme delta-aminolevulinic acid dehydrase

(ALA-D). Although the test is relatively easy to perform, inexpensive, and rapid, the disadvantages include variability in results, the necessity to collect a complete 24 hour urine sample which has a specific gravity greater than 1.010, and also the fact that ALA decomposes in the presence of light.

The pattern of porphyrin excretion in the urine can also be helpful in identifying lead intoxication. With lead poisoning, the urine concentrations of coproporphyrins I and II, porphobilinogen and uroporphyrin I rise. The most important increase, however, is that of coproporphyrin III; levels may exceed 5,000 µg/l in the urine in lead poisoned individuals, but its correlation with blood lead levels and ZPP are not as good as those of ALA. Increases in urinary porphyrins are not diagnostic of lead toxicity and may be seen in porphyria, some liver diseases, and in patients with high reticulocyte counts.

Summary. The Washington Industrial Safety and Health Act's standard for inorganic lead in the construction industry places significant emphasis on the medical surveillance of all workers exposed to levels of inorganic lead above 30 µg/m³ TWA. The physician has a fundamental role in this surveillance program, and in the operation of the medical removal protection program.

Even with adequate worker education on the adverse health effects of lead and appropriate training in work practices, personal hygiene and other control measures, the physician has a primary responsibility for evaluating potential lead toxicity in the worker. It is only through a careful and detailed medical and work history, a complete physical examination and appropriate laboratory testing that an accurate assessment can be made. Many of the adverse health effects of lead toxicity are either irreversible or only partially reversible and therefore early detection of disease is very important.

This document outlines the medical monitoring program as defined by the occupational safety and health standard for inorganic lead. It reviews the adverse health effects of lead poisoning and describes the important elements of the history and physical examinations as they relate to these adverse effects. Finally, the appropriate laboratory testing for evaluating lead exposure and toxicity is presented.

It is hoped that this review and discussion will give the physician a better understanding of the WISHA standard with the ultimate goal of protecting the health and well-being of the worker exposed to lead under their care.

[Statutory Authority: Chapter 49.17 RCW. 93-22-054 (Order 93-07), § 296-155-17654, filed 10/29/93, effective 12/10/93.]

WAC 296-155-17656 Appendix D to WAC 296-155-176—Qualitative and quantitative fit test protocols. Fit test protocols.

(1) Definitions.

(a) **Quantitative fit test.** The test is performed in a test chamber. The normal air-purifying element of the respirator is replaced by a high-efficiency particulate air (HEPA) filter in the case of particulate QNFT aerosols or a sorbent offering contaminant penetration protection equivalent to high-efficiency filters where the QNFT test agent is a gas or vapor.

(b) Challenge agent means the aerosol, gas or vapor introduced into a test chamber so that its concentration inside and outside the respirator may be measured.

(c) Test subject means the person wearing the respirator for quantitative fit testing.

(d) Normal standing position means standing erect and straight with arms down along the sides and looking straight ahead.

(e) Maximum peak penetration method means the method of determining test agent penetration in the respirator as determined by strip chart recordings of the test. The highest peak penetration for a given exercise is taken to be representative of average penetration into the respirator for that exercise.

(f) Average peak penetration method means the method of determining test agent penetration into the respirator utilizing a strip chart recorder, integrator, or computer. The agent penetration is determined by an average of the peak heights on the graph or by computer integration, for each exercise except the grimace exercise. Integrators or computers which calculate the actual test agent penetration into the respirator for each exercise will also be considered to meet the requirements of the average peak penetration method.

(g) "Fit factor" means the ration of challenge agent concentration outside with respect to the inside of a respirator inlet covering (facepiece or enclosure).

(2) General: The employer shall include the following provisions in the fit test procedures. These provisions apply to both qualitative fit testing (QLFT) and quantitative fit testing (QNFT) permissible for compliance with WAC 296-155-17613 (3)(b). All testing shall be conducted annually.

(a) The test subject shall be allowed to pick the most comfortable respirator from a selection including respirators of various sizes from different manufacturers. The selection shall include at least three sizes of elastomeric facepieces of the type of respirator that is to be tested, i.e., three sizes of half mask; or three sizes of full facepiece. Respirators of each size must be provided from at least two manufacturers.

(b) Prior to the selection process, the test subject shall be shown how to put on a respirator, how it should be positioned on the face, how to set strap tension and how to determine a comfortable fit. A mirror shall be available to assist the subject in evaluating the fit and positioning the respirator. This instruction may not constitute the subject's formal training on respirator use, as it is only a review.

(c) The test subject shall be informed they are being asked to select the respirator which provides the most comfortable fit. Each respirator represents a different size and shape, and if fitted, maintained and used properly, will provide adequate protection.

(d) The test subject shall be instructed to hold each facepiece up to the face and eliminate those which obviously do not give a comfortable fit.

(e) The more comfortable facepieces are noted; the most comfortable mask is donned and worn at least five minutes to assess comfort. Assistance in assessing comfort can be given by discussing the points in item 6 below. If the test subject is not familiar with using a particular respirator, the test subject shall be directed to don the mask several times and to adjust the straps each time to become adept at setting proper tension on the straps.

(f) Assessment of comfort shall include reviewing the following points with the test subject and allowing the test subject adequate time to determine the comfort of the respirator:

(i) Position of the mask on the nose;

(ii) Room for eye protection;

(iii) Room to talk; and

(iv) Position of mask on face and cheeks.

(g) The following criteria shall be used to help determine the adequacy of the respirator fit:

(i) Chin properly placed;

(ii) Adequate strap tension, not overly tightened;

(iii) Fit across nose bridge;

(iv) Respirator of proper size to span distance from nose to chin;

(v) Tendency of respirator to slip; and

(vi) Self-observation in mirror to evaluate fit and respirator position.

(h) The test subject shall conduct the negative and positive pressure fit checks as described below or in ANSI Z88.2-1980. Before conducting the negative or positive pressure test, the subject shall be told to seat the mask on the face by moving the head from side-to-side and up and down slowly while taking in a few slow deep breaths. Another facepiece shall be selected and retested if the test subject fails the fit check tests.

(i) Positive pressure check. Close off the exhalation valve and exhale gently into the facepiece. The face fit is considered satisfactory if a slight positive pressure can be built up inside the facepiece without any evidence of outward leakage of air at the seal. For most respirators this method of leak testing requires the wearer to first remove the exhalation valve cover before closing off the exhalation valve and then carefully replacing it after the test.

(ii) Negative pressure check. Close off the inlet opening of the canister or cartridge(s) by covering with the palm of the hand(s) or by replacing the filter seal(s), inhale gently so that the facepiece collapses slightly, and hold the breath for ten seconds. If the facepiece remains in its slightly collapsed condition and no inward leakage of air is detected, the tightness of the respirator is considered satisfactory.

(i) The test shall not be conducted if there is any hair growth between the skin and the facepiece sealing surface, such as stubble beard growth, beard, or long sideburns which cross the respirator sealing surface. Any type of apparel which interferes with a satisfactory fit shall be altered or removed.

(j) If a test subject exhibits difficulty in breathing during the tests, they shall be referred to a physician to determine whether the test subject can wear a respirator while performing their duties.

(k) If at any time within the first two week of use the respirator becomes uncomfortable, the test subject shall be given the opportunity to select a different facepiece and to be retested.

(l) The employer shall maintain a record of the fit test administered to an employee. The record shall contain at least the following information:

(i) Name of employee;

(ii) Type of respirator;

(iii) Brand, size of respirator;

(iv) Date of test;

(v) Where QNFT is used: The fit factor, strip chart recording or other recording of the results of the test. The record shall be maintained until the next fit test is administered.

(m) Exercise regimen. Prior to the commencement of the fit test, the test subject shall be given a description of the fit test and the test subject's responsibilities during the test procedure. The description of the process shall include a description of the test exercises that the subject will be performing. The respirator to be tested shall be worn for at least 5 minutes before the start of the fit test.

(n) Test exercises. The test subject shall perform exercises, in the test environment, in the manner described below:

(i) Normal breathing. In a normal standing position, without talking, the subject shall breathe normally.

(ii) Deep breathing. In a normal standing position, the subject shall breathe slowly and deeply, taking caution so as to not hyperventilate.

(iii) Turning head side to side. Standing in place, the subject shall slowly turn their head from side to side between the extreme positions on each side. The head shall be held at each extreme momentarily so the subject can inhale at each side.

(iv) Moving head up and down. Standing in place, the subject shall slowly move their head up and down. The subject shall be instructed to inhale in the up position (i.e., when looking toward the ceiling).

(v) Talking. The subject shall talk out loud slowly and loud enough so as to be heard clearly by the test conductor. The subject can read from a prepared text such as the Rainbow Passage (see below), count backward from 100, or recite a memorized poem or song.

Rainbow passage.

When the sunlight strikes raindrops in the air, they act like a prism and form a rainbow. The rainbow is a division of white light into many beautiful colors. These take the shape of a long round arch, with its path high above, and its two ends apparently beyond the horizon. There is, according to legend, a boiling pot of gold at one end. People look, but no one ever finds it. When a man looks for something beyond reach, his friends say he is looking for the pot of gold at the end of the rainbow.

(vi) Grimace. The test subject shall grimace by smiling or frowning.

(vii) Bending over. The test subject shall bend at the waist as if they were to touch their toes. Jogging in place shall be substituted for this exercise in those test environments such as shroud type QNFT units which prohibit bending at the waist.

(viii) Normal breathing. Same as exercise 1. Each test exercise shall be performed for one minute except for the grimace exercise which shall be performed for 15 seconds. The test subject shall be questioned by the test conductor regarding the comfort of the respirator upon completion of the protocol. If it has become uncomfortable, another model of respirator shall be tried.

(3) Qualitative fit test (QLFT) protocols.

(a) General.

(i) The employer shall assign specific individuals who shall assume full responsibility for implementing the respirator qualitative fit test program.

(ii) The employer shall ensure that persons administering QLFT are able to prepare test solutions, calibrate equipment and perform tests properly, recognize invalid tests, and assure that test equipment is in proper working order.

(iii) The employer shall assure that QLFT equipment is kept clean and well maintained so as to operate at the parameters for which it was designed.

(b) Isoamyl acetate protocol.

(i) Odor threshold screening. The odor threshold screening test, performed without wearing a respirator, is intended to determine if the individual tested can detect the odor of isoamyl acetate.

(A) Three 1 liter glass jars with metal lids are required.

(B) Odor free water (e.g., distilled or spring water) at approximately 25 degrees C shall be used for the solutions.

(C) The isoamyl acetate (IAA) (also known as isopentyl acetate) stock solution is prepared by adding 1 cc of pure IAA to 800 cc of odor free water in a 1 liter jar and shaking for 30 seconds. A new solution shall be prepared at least weekly.

(D) The screening test shall be conducted in a room separate from the room used for actual fit testing. The two rooms shall be well ventilated but shall not be connected to the same recirculating ventilation system.

(E) The odor test solution is prepared in a second jar by placing 0.4 cc of the stock solution into 500 cc of odor free water using a clean dropper or pipette. The solution shall be shaken for 30 seconds and allowed to stand for two to three minutes so that the IAA concentration above the liquid may reach equilibrium. This solution shall be used for only one day.

(F) A test blank shall be prepared in a third jar by adding 500 cc of odor free water.

(G) The odor test and test blank jars shall be labeled 1 and 2 for jar identification. Labels shall be placed on the lids so they can be periodically peeled, dried off and switched to maintain the integrity of the test.

(H) The following instruction shall be typed on a card and placed on the table in front of the two test jars (i.e., 1 and 2): "The purpose of this test is to determine if you can smell banana oil at a low concentration. The two bottles in front of you contain water. One of these bottles also contains a small amount of banana oil. Be sure the covers are on tight, then shake each bottle for two seconds. Unscrew the lid of each bottle, one at a time, and sniff at the mouth of the bottle. Indicate to the test conductor which bottle contains banana oil."

(I) The mixtures used in the IAA odor detection test shall be prepared in an area separate from where the test is performed, in order to prevent olfactory fatigue in the subject.

(J) If the test subject is unable to correctly identify the jar containing the odor test solution, the IAA qualitative fit test shall not be performed.

(K) If the test subject correctly identifies the jar containing the odor test solution, the test subject may proceed to respirator selection and fit testing.

(ii) Isoamyl acetate fit test.

(A) The fit test chamber shall be similar to a clear 55-gallon drum liner suspended inverted over a 2-foot diameter frame so that the top of the chamber is about 6 inches above

the test subject's head. The inside top center of the chamber shall have a small hook attached.

(B) Each respirator used for the fitting and fit testing shall be equipped with organic vapor cartridges or offer protection against organic vapors. The cartridges or masks shall be changed at least weekly.

(C) After selecting, donning, and properly adjusting a respirator, the test subject shall wear it to the fit testing room. This room shall be separate from the room used for odor threshold screening and respirator selection, and shall be well ventilated, as by an exhaust fan or lab hood, to prevent general room contamination.

(D) A copy of the test exercises and any prepared text from which the subject is to read shall be taped to the inside of the test chamber.

(E) Upon entering the test chamber, the test subject shall be given a 6-inch by 5-inch piece of paper towel, or other porous, absorbent, single-ply material, folded in half and wetted with 0.75 cc of pure IAA. The test subject shall hang the wet towel on the hook at the top of the chamber.

(F) Allow two minutes for the IAA test concentration to stabilize before starting the fit test exercises. This would be an appropriate time to talk with the test subject; to explain the fit test, the importance of their cooperation, and the purpose for the head exercises; or to demonstrate some of the exercises.

(G) If at any time during the test, the subject detects the banana like odor of IAA, the test has failed. The subject shall quickly exit from the test chamber and leave the test area to avoid olfactory fatigue.

(H) If the test has failed, the subject shall return to the selection room and remove the respirator, repeat the odor sensitivity test, select and put on another respirator, return to the test chamber and again begin the procedure described in subitems (A) through (G) of this item. The process continues until a respirator that fits well has been found. Should the odor sensitivity test be failed, the subject shall wait about 5 minutes before retesting. Odor sensitivity will usually have returned by this time.

(I) When a respirator is found that passes the test, its efficiency shall be demonstrated for the subject by having the subject break the face seal and take a breath before exiting the chamber.

(J) When the test subject leaves the chamber, the subject shall remove the saturated towel and return it to the person conducting the test. To keep the test area from becoming contaminated, the used towels shall be kept in a self sealing bag so there is no significant IAA concentration build-up in the test chamber during subsequent tests.

(c) Saccharin solution aerosol protocol. The entire screening and testing procedure shall be explained to the test subject prior to the conduct of the screening test.

(i) Taste threshold screening. The saccharin taste threshold screening, performed without wearing a respirator, is intended to determine whether the individual being tested can detect the taste of saccharin.

(A) During threshold screening as well as during fit testing, subjects shall wear an enclosure about the head and shoulders that is approximately 12 inches in diameter by 14 inches tall with at least the front portion clear and that allows free movements of the head when a respirator is worn. An enclosure substantially similar to the 3M hood

assembly, parts (R) FT 14 and (R) FT 15 combined, is adequate.

(B) The test enclosure shall have a 3/4 inch hole in front of the test subject's nose and mouth area to accommodate the nebulizer nozzle.

(C) The test subject shall don the test enclosure. Throughout the threshold screening test, the test subject shall breathe through their wide open mouth with tongue extended.

(D) Using a DeVilbiss Model 40 Inhalation Medication Nebulizer the test conductor shall spray the threshold check solution into the enclosure. This nebulizer shall be clearly marked to distinguish it from the fit test solution nebulizer.

(E) The threshold check solution consists of 0.83 grams of sodium saccharin USP in 100 cc of warm water. It can be prepared by putting 1 cc of the fit test solution (see (ii)(E) below) in 100 cc of distilled water.

(F) To produce the aerosol, the nebulizer bulb is firmly squeezed so that it collapses completely, then released and allowed to fully expand.

(G) Ten squeezes are repeated rapidly and then the test subject is asked whether the saccharin can be tasted.

(H) If the first response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the saccharin is tasted.

(I) If the second response is negative, ten more squeezes are repeated rapidly and the test subject is again asked whether the saccharin is tasted.

(J) The test conductor will take note of the number of squeezes required to solicit a taste response.

(K) If the saccharin is not tasted after 30 squeezes (step 10), the test subject may not perform the saccharin fit test.

(L) If a taste response is elicited, the test subject shall be asked to take note of the taste for reference in the fit test.

(M) Correct use of the nebulizer means that approximately 1 cc of liquid is used at a time in the nebulizer body.

(N) The nebulizer shall be thoroughly rinsed in water, shaken dry, and refilled at least each morning and afternoon or at least every four hours.

(ii) Saccharin solution aerosol fit test procedure.

(A) The test subject may not eat, drink (except plain water), or chew gum for 15 minutes before the test.

(B) The fit test uses the same enclosure described in subdivision (c)(i) of this subsection.

(C) The test subject shall don the enclosure while wearing the respirator selected in subdivision (c)(i) of this subsection. The respirator shall be properly adjusted and equipped with a particulate filter(s).

(D) A second DeVilbiss Model 40 Inhalation Medication Nebulizer is used to spray the fit test solution into the enclosure. This nebulizer shall be clearly marked to distinguish it from the screening test solution nebulizer.

(E) The fit test solution is prepared by adding 83 grams of sodium saccharin to 100 cc of warm water.

(F) As before, the test subject shall breathe through the wide open mouth with tongue extended.

(G) The nebulizer is inserted into the hole in the front of the enclosure and the fit test solution is sprayed into the enclosure using the same number of squeezes required to elicit a taste response in the screening test.

(H) After generating the aerosol the test subject shall be instructed to perform the exercises in subsection (2)(n) of this section.

(I) Every 30 seconds the aerosol concentration shall be replenished using one half the number of squeezes as initially.

(J) The test subject shall indicate to the test conductor if at any time during the fit test the taste of saccharin is detected.

(K) If the taste of saccharin is detected, the fit is deemed unsatisfactory and a different respirator shall be tried.

(L) Successful completion of the test protocol shall allow the use of the tested respirator in contaminated atmospheres up to 10 times the PEL. In other words, this protocol may be used for assigned protection factors no higher than 10.

(d) Irritant fume protocol.

(i) The respirator to be tested shall be equipped with high-efficiency particulate air (HEPA) filters.

(ii) The test subject shall be allowed to smell a weak concentration of the irritant smoke before the respirator is donned to become familiar with its characteristic odor.

(iii) Break both ends of a ventilation smoke tube containing stannic oxychloride, such as the MSA part No. 5645, or equivalent. Attach one end of the smoke tube to a low flow air pump set to deliver 200 milliliters per minute.

(iv) Advise the test subject that the smoke can be irritating to the eyes and instruct the subject to keep their eyes closed while the test is performed.

(v) The test conductor shall direct the stream of irritant smoke from the smoke tube towards the face seal area of the test subject. They shall begin at least 12 inches from the facepiece and gradually move to within one inch, moving around the whole perimeter of the mask.

(vi) The exercises identified in subsection (2)(n) of this section above shall be performed by the test subject while the respirator seal is being challenged by the smoke.

(vii) Each test subject passing the smoke test without evidence of a response shall be given a sensitivity check of the smoke from the same tube once the respirator has been removed to determine whether their reactions to the smoke. Failure to evoke a response shall void the fit test.

(viii) The fit test shall be performed in a location with exhaust ventilation sufficient to prevent general contamination of the testing area by the test agent.

(4) Quantitative fit test (QNFT) protocol.

(a) General.

(i) The employer shall assign specific individuals who shall assume full responsibility for implementing the respirator quantitative fit test program.

(ii) The employer shall ensure that persons administering QNFT are able to calibrate equipment and perform tests properly, recognize invalid tests, calculate fit factors properly and assure that test equipment is in proper working order.

(iii) The employer shall assure that QNFT equipment is kept clean and well maintained so as to operate at the parameters for which it was designed.

(b) Apparatus.

(i) Instrumentation. Aerosol generation, dilution, and measurement systems using corn oil or sodium chloride as test aerosols shall be used for quantitative fit testing.

(ii) Test chamber. The test chamber shall be large enough to permit all test subjects to perform freely all required exercises without disturbing the challenge agent concentration or the measurement apparatus. The test chamber shall be equipped and constructed so that the challenge agent is effectively isolated from the ambient air, yet uniform in concentration throughout the chamber.

(iii) When testing air-purifying respirators, the normal filter or cartridge element shall be replaced with a high-efficiency particulate filter supplied by the same manufacturer.

(iv) The sampling instrument shall be selected so that a strip chart record may be made of the test showing the rise and fall of the challenge agent concentration with each inspiration and expiration at fit factors of at least 2,000. Integrators or computers which integrate the amount of test agent penetration leakage into the respirator for each exercise may be used provided a record of the readings is made.

(v) The combination of substitute air-purifying elements, challenge agent and challenge agent concentration in the test chamber shall be such that the test subject is not exposed in excess of an established exposure limit for the challenge agent at any time during the testing process.

(vi) The sampling port on the test specimen respirator shall be placed and constructed so that no leakage occurs around the port (e.g., where the respirator is probed), a free air flow is allowed into the sampling line at all times and so that there is no interference with the fit or performance of the respirator.

(vii) The test chamber and test set up shall permit the person administering the test to observe the test subject inside the chamber during the test.

(viii) The equipment generating the challenge atmosphere shall maintain the concentration of challenge agent inside the test chamber constant to within a 10 percent variation for the duration of the test.

(ix) The time lag (interval between an event and the recording of the event on the strip chart or computer or integrator) shall be kept to a minimum. There shall be a clear association between the occurrence of an event inside the test chamber and its being recorded.

(x) The sampling line tubing for the test chamber atmosphere and for the respirator sampling port shall be of equal diameter and of the same material. The length of the two lines shall be equal.

(xi) The exhaust flow from the test chamber shall pass through a high-efficiency filter before release.

(xii) When sodium chloride aerosol is used, the relative humidity inside the test chamber shall not exceed 50 percent.

(xiii) The limitations of instrument detection shall be taken into account when determining the fit factor.

(xiv) Test respirators shall be maintained in proper working order and inspected for deficiencies such as cracks, missing valves and gaskets, etc.

(c) Procedural requirements.

(i) When performing the initial positive or negative pressure test the sampling line shall be crimped closed in order to avoid air pressure leakage during either of these tests.

(ii) An abbreviated screening isoamyl acetate test or irritant fume test may be utilized in order to quickly identify poor fitting respirators which passed the positive and/or

negative pressure test and thus reduce the amount of QNFT time. When performing a screening isoamyl acetate test, combination high-efficiency organic vapor cartridges/canisters shall be used.

(iii) A reasonably stable challenge agent concentration shall be measured in the test chamber prior to testing. For canopy or shower curtain type of test units the determination of the challenge agent stability may be established after the test subject has entered the test environment.

(iv) Immediately after the subject enters the test chamber, the challenge agent concentration inside the respirator shall be measured to ensure that the peak penetration does not exceed 5 percent for a half mask or 1 percent for a full facepiece respirator.

(v) A stable challenge concentration shall be obtained prior to the actual start of testing.

(vi) Respirator restraining straps shall not be overtightened for testing. The straps shall be adjusted by the wearer without assistance from other persons to give a reasonable comfortable fit typical of normal use.

(vii) The test shall be terminated whenever any single peak penetration exceeds 5 percent for half masks and 1 percent for full facepiece respirators. The test subject shall be refitted and retested. If two of the three required tests are terminated, the fit shall be deemed inadequate.

(viii) In order to successfully complete a QNFT, three successful fit tests are required. The results of each of the three independent fit tests must exceed the minimum fit factor needed for the class of respirator (e.g., half mask respirator, full facepiece respirator).

(ix) Calculation of fit factors.

(A) The fit factor shall be determined for the quantitative fit test by taking the ratio of the average chamber concentration to the concentration inside the respirator.

(B) The average test chamber concentration is the arithmetic average of the test chamber concentration at the beginning and of the end of the test.

(C) The concentration of the challenge agent inside the respirator shall be determined by one of the following methods:

(I) Average peak concentration.

(II) Maximum peak concentration.

(III) Integration by calculation of the area under the individual peak for each exercise. This includes computerized integration.

(x) Interpretation of test results. The fit factor established by the quantitative fit testing shall be the lowest of the three fit factor values calculated from the three required fit tests.

(xi) The test subject shall not be permitted to wear a half mask, or full facepiece respirator unless a minimum fit factor equivalent to at least 10 times the hazardous exposure level is obtained.

(xii) Filters used for quantitative fit testing shall be replaced at least weekly, or whenever increased breathing resistance is encountered, or when the test agent has altered the integrity of the filter media. Organic vapor cartridges/canisters shall be replaced daily (when used) or sooner if there is any indication of breakthrough by a test agent.

[Statutory Authority: Chapter 49.17 RCW. 93-22-054 (Order 93-07), § 296-155-17656, filed 10/29/93, effective 12/10/93.]

(1997 Ed.)

PART B-2 HAZARD COMMUNICATION

WAC 296-155-180 Hazard communication. General.

The employer shall develop and maintain a hazard communication program as required by chapter 296-62 WAC, Part C, which will provide information to all employees relative to hazardous chemicals or substances to which they are exposed, or may become exposed, in the course of their employment.

[Statutory Authority: Chapter 49.17 RCW. 94-16-145, § 296-155-180, filed 8/3/94, effective 9/12/94; 89-11-035 (Order 89-03), § 296-155-180, filed 5/15/89, effective 6/30/89.]

PART C PERSONAL PROTECTIVE AND LIFE SAVING EQUIPMENT

WAC 296-155-200 General requirements. (1) Application.

(a) Protective equipment, including personal protective equipment for eyes, face, head, hearing, and extremities, protective clothing, respiratory devices, and protective shields and barriers, shall be used, and maintained in a sanitary and reliable condition wherever it is necessary by reason of hazards of processes or environment, chemical hazards, radiological hazards, or mechanical irritants encountered in a manner capable of causing injury or impairment in the function of any part of the body through absorption, inhalation or physical contact.

(b) Employee owned equipment. Where employees provide their own protective equipment, the employer shall be responsible to assure its adequacy, including proper maintenance and sanitation of such equipment.

(c) Design. All personal protective equipment shall be of safe design and construction for the work to be performed.

(2) Construction personnel shall comply with plant or job safety practices and procedures, peculiar to particular industries and plants, relating to protective equipment and procedures when engaged in construction work in such plants or job sites.

(3) The employer is responsible for requiring the wearing of appropriate personal protective equipment in all operations where there is an exposure to hazardous conditions or where this part indicates a need for using such equipment to reduce the hazards to the employees.

(4) Where there is a danger of contact with moving parts of machinery, or the work process is such that a hazard exists:

(a) The clothing of employees shall fit closely about the body.

(b) Dangling neck wear, bracelets, wristwatches, rings, or similar articles shall not be worn by employees.

(5) Employees, whose duties are performed in areas and under circumstances where they are exposed to the danger of moving vehicles, shall wear work vests of highly visible materials, or equivalent distinguishing apparel.

(6) Employers shall ensure that employees wear no less than a short sleeved shirt, long pants, and shoes. Employees

shall wear no less than a short sleeved shirt, long pants, and shoes. Shoes shall meet the requirements of WAC 296-155-212.

Note: For additional personal protective and life saving equipment requirements, refer to the general safety and health standards, WAC 296-24-075 through 296-24-092.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-200, filed 7/20/94, effective 9/20/94. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-200, filed 1/21/86; Order 76-29, § 296-155-200, filed 9/30/76; Order 74-26, § 296-155-200, filed 5/7/74, effective 6/6/74.]

WAC 296-155-201 Definitions applicable to this chapter. (1) "Catenary life line" means a horizontal rope between two fixed anchorages, independent of the work surface, to which the lanyard is attached, either by tying or by means of a sliding connection. A catenary life line shall be capable of supporting a minimum dead weight of 5,400 pounds per person, applied at the midpoint of the line.

(2) "Contaminant" means any material which by reason of its action upon, within, or to a person or object is likely to cause physical harm.

(3) "Dropline" means a vertical rope from a fixed anchorage, independent of the work surface, to which the lanyard is affixed or tied.

(4) "Fixed anchorage" means a secure point of attachment, not a part of the work surface, for droplines, lifelines, catenary life lines, or lanyards. The fixed anchorage and its appurtenances shall be capable of supporting a minimum dead weight of 5,400 pounds per worker.

(5) "Lanyard" means a rope, suitable for supporting one person. One end is fastened to a safety belt or harness and the other end is secured to a substantial object or a safety line.

(6) "Lifeline" means a rope, suitable for supporting one person, to which a lanyard or safety belt (or harness) is attached.

(7) "O.D." means optical density and refers to the light refractive characteristics of a lens.

(8) "Radiant energy" means energy that travels outward in all directions from its source.

(9) "Safety belt" means a device, usually worn around the waist which, by reason of its attachment to a lanyard and lifeline or a structure, will prevent a worker from falling.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-201, filed 1/21/86; Order 76-6, § 296-155-201, filed 3/1/76.]

WAC 296-155-203 Confined spaces. All work conducted in a confined space shall comply with the provisions of chapter 296-62 WAC Part M, and the following sections.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-203, filed 7/20/94, effective 9/20/94. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-203, filed 1/21/86.]

WAC 296-155-20301 Definitions. Confined space means a space that:

(1) Is large enough and so configured that an employee can bodily enter and perform assigned work; and

(2) Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry); and

(3) Is not designed for continuous employee occupancy. "Corrosives" means substances which in contact with living tissue cause destruction of the tissue by chemical action.

"Hazardous atmosphere" means an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (that is, escape unaided from a permit space), injury, or acute illness from one or more of the following causes:

(1) Flammable gas, vapor, or mist in excess of ten percent of its lower flammable limit (LFL);

(2) Airborne combustible dust at a concentration that meets or exceeds its LFL;

Note: This concentration may be approximated as a condition in which the dust obscures vision at a distance of five feet (1.52m) or less.

(3) Atmospheric oxygen concentration below 19.5 percent or above 23.5 percent;

(4) Atmospheric concentration of any substance for which a dose or a permissible exposure limit is published in chapter 296-62 WAC, general occupational health standards, and which could result in employee exposure in excess of its dose or permissible exposure limit;

Note: An atmospheric concentration of any substance that is not capable of causing death, incapacitation, impairment of ability to self-rescue, injury, or acute illness due to its health effects is not covered by this provision.

(5) Any other atmospheric condition that is immediately dangerous to life or health.

Note: For air contaminants for which WISHA has not determined a dose or permissible exposure limit, other sources of information, such as material safety data sheets that comply with the Hazard Communication Standard, chapter 296-62 WAC, Part C, published information, and internal documents can provide guidance in establishing acceptable atmospheric conditions.

"Irritants" means substances which on immediate, prolonged, or repeated contact with normal living tissue will induce a local inflammatory reaction.

"Oxygen deficient atmospheres" means atmospheres at sea level having less than 19.5% oxygen by volume or having a partial pressure of 148 millimeters of mercury or less. This may deviate when working at higher altitudes and should be determined for an individual location. Factors such as acclimatization, physical condition of persons involved, etc., must be considered for such circumstances and conditions. (See chapter 296-62 WAC, Part M, permit-required confined spaces.)

"Toxicants" means substances which have the inherent capacity to produce personal injury or illness to persons by absorption through any body surface.

[Statutory Authority: RCW 49.17.040, [49.17].050 and [49.17].060. 95-17-036, § 296-155-20301, filed 8/9/95, effective 9/25/95. Statutory Authority: Chapter 49.17 RCW. 95-04-007, § 296-155-20301, filed 1/18/95, effective 3/1/95; 91-24-017 (Order 91-07), § 296-155-20301, filed 11/22/91, effective 12/24/91. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-20301, filed 1/21/86.]

WAC 296-155-20307 Confined space work on sewer systems under construction. New systems under construction or new installations which have not yet been connected to a used system, may substitute forced ventilation for the testing requirements of chapter 296-62 WAC Part M provided:

- (1) Ventilation is effectively provided at least five minutes prior to entry into the confined space;
- (2) Ventilation is provided, as required by WAC 296-62-110, et seq., which supplies a continuous flow of air;
- (3) Ventilation exhaust is discharged so as to present no hazard to other employees;
- (4) An attendant is provided at the surface when there are employees in the manhole or pipe. The attendant shall not leave the manhole unattended until such time as all employees are out and the cover has been replaced; and
- (5) All other requirements for confined spaces are observed. See chapter 296-62 WAC Part M.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-20307, filed 7/20/94, effective 9/20/94. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-20307, filed 1/21/86.]

WAC 296-155-205 Head protection. (1) All employees on any construction site shall be provided an individual hard hat which meets all requirements of (a) and (b) of this subsection. Employers shall provide individual hard hats at no cost to the employees.

(a) Hard hats for the protection of employees against impact and/or penetration of falling and flying objects shall meet the specifications contained in American National Standards Institute, Z89.1-1969, Safety Requirements for Industrial Head Protection.

(b) Hard hats for the head protection of employees exposed to high voltage electrical shock and burns shall meet the specifications contained in American National Standards Institute, Z89.2-1971.

(2) All employees must have their individual hard hats on site and readily available at all times.

(3) All employees shall wear a hard hat on any construction site whenever there is a potential exposure to danger of flying or falling objects to persons working or occupying the area.

Note: The hard hat may be removed whenever there is no potential exposure to a hazard.

(4) Employees working on asphalt paving crews when they are exposed to extreme temperatures from hot mix and when they are not exposed to falling objects need not wear protective hard hats. Flaggers working in conjunction with asphalt paving operations shall wear protective hard hats.

(5) Caps with metal buttons or metal visors shall not be worn around electrical hazards.

(6) Employees working near moving machinery or in locations which present a hair-catching or fire hazard shall wear caps, nets or other head and face protection that will completely contain the hair.

[Statutory Authority: Chapter 49.17 RCW. 91-11-070 (Order 91-01), § 296-155-205, filed 5/20/91, effective 6/20/91; 89-11-035 (Order 89-03), § 296-155-205, filed 5/15/89, effective 6/30/89. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-205, filed 1/21/86; Order 74-26, § 296-155-205, filed 5/7/74, effective 6/6/74.]

WAC 296-155-210 Hearing protection. The hearing protection requirements of the general occupational health standards, chapter 296-62 WAC, shall apply.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-155-210, filed 11/30/83; Order 74-26, § 296-155-210, filed 5/7/74, effective 6/6/74.]

WAC 296-155-211 Leg protection. Employees whose duties require them to operate a power chain saw shall wear flexible ballistic nylon pads, sewn or otherwise fastened into the trousers, or other equivalent protection that will protect the vulnerable areas of the legs.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-211, filed 1/21/86.]

WAC 296-155-212 Foot protection. (1) Substantial footwear, made of leather or other equally firm material, shall be worn by employees in any occupation in which there is a danger of injury to the feet through falling or moving objects, or from burning, scalding, cutting, penetration, or like hazard.

(a) The soles and heels of such footwear shall be of a material that will not create a slipping hazard.

(b) Shoes made of leather or other firm materials that have soft athletic-type soles which would protect employees from foot injuries and at the same time, provide soft and firm footing while working under specialty requirements or with specialty materials are acceptable if meeting safety shoe requirements established by OSHA or ANSI.

(c) Footwear that has deteriorated to a point where it does not provide the required protection shall not be used.

(2) Calks or other suitable footwear, which will afford reasonable protection from slipping, shall be worn while working on logs, poles, pilings, or similar forest products.

(3) Traditional tennis shoes, shoes with canvas tops, or thin or soft soled athletic shoes, open toed sandals, slippers, dress shoes or other similar type shoes shall not be worn. Soft or athletic-type soles with uppers of leather or other substantial material may be used where firm footing is desired and where minimal danger of injury to feet from falling or moving objects.

(4) Safety-toe footwear for employees shall meet the requirements and specifications in American National Standard for Men's Safety-Toe Footwear, Z41.1-1967.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-212, filed 7/20/94, effective 9/20/94; 89-11-035 (Order 89-03), § 296-155-212, filed 5/15/89, effective 6/30/89. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-212, filed 1/21/86; Order 74-26, § 296-155-212, filed 5/7/74, effective 6/6/74.]

WAC 296-155-215 Eye and face protection. (1) General.

(a) Employees shall use eye and face protection equipment when machines or operations present potential eye or face injury from physical, chemical, or radiation agents.

(b) Eye and face protection equipment required by this part shall meet the requirements specified in American National Standards Institute, Z87.1-1968, Practice for Occupational and Educational Eye and Face Protection.

(c) Employees whose vision requires the use of corrective lenses in spectacles, when required by this regulation to wear eye protection, shall be protected by goggles or spectacles of one of the following types:

(i) Spectacles whose protective lenses provide optical correction;

(ii) Goggles that can be worn over corrective spectacles without disturbing the adjustment of the spectacles.

(iii) Goggles that incorporate corrective lenses mounted behind the protective lenses.

(d) Face and eye protection equipment shall be kept clean and in good repair. The use of this type equipment with structural or optical defects shall be prohibited.

(e) Table C-1 shall be used as a guide in the selection of face and eye protection for the hazards and operations noted.

(f) Protectors shall meet the following minimum requirements:

(i) They shall provide adequate protection against the particular hazards for which they are designed.

(ii) They shall be reasonably comfortable when worn under the designated conditions.

(iii) They shall fit snugly and shall not unduly interfere with the movements of the wearer.

(iv) They shall be durable.

(v) They shall be capable of being disinfected.

(vi) They shall be easily cleanable.

(g) Every protector shall be distinctly marked to facilitate identification only of the manufacturer.

(h) When limitations or precautions are indicated by the manufacturer, they shall be transmitted to the user and care taken to see that such limitations and precautions are strictly observed.

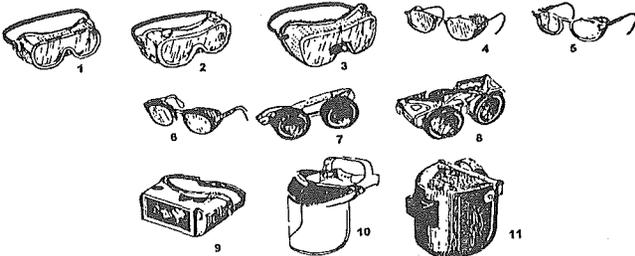


TABLE C-1

EYE AND FACE PROTECTION SELECTION GUIDE

1. GOGGLES, flexible fitting, regular ventilation
2. GOGGLES, flexible fitting, hooded ventilation
3. GOGGLES, cushioned fitting, rigid body
- *4. SPECTACLES, metal frame, with sideshields
- *5. SPECTACLES, plastic frame with sideshields
- *6. SPECTACLES, metal-plastic frame, with sideshields
- **7. WELDING GOGGLES, eyecup type, tinted lenses (illustrated)
- 7A. CHIPPING GOGGLES, eyecup type, clear safety lenses (not illustrated)
- **8. WELDING GOGGLES, coverspec type tinted lenses (illustrated)
- 8A. CHIPPING GOGGLES, coverspec type, clear safety lenses (not illustrated)
- **9. WELDING GOGGLES, coverspec type, tinted plate lens
10. FACE SHIELD (available with plastic or mesh window)
11. WELDING HELMETS

* Nonside shield spectacles are available for limited hazard use requiring only frontal protection.

** See Table C-2 in (2) of this section, Filter lens shade numbers for protection against radiant energy.

APPLICATIONS

OPERATION	HAZARDS	RECOMMENDED PROTECTORS: Underscored Numbers Signify Preferred Protection
ACETYLENE-BURNING ACETYLENE-CUTTING ACETYLENE-WELDING	SPARKS, HARMFUL RAYS, MOLTEN METAL, FLYING PARTICLES	<u>7</u> , <u>8</u> , <u>9</u>
CHEMICAL HANDLING	SPLASH, ACID BURNS, FUMES	<u>2</u> , <u>10</u> (for severe exposure add <u>10</u> over 2)
CHIPPING	FLYING PARTICLES	<u>1</u> , <u>3</u> , <u>4</u> , <u>5</u> , <u>6</u> , <u>7A</u> , <u>8A</u>
ELECTRIC (ARC) WELDING	SPARKS, INTENSE RAYS, MOLTEN METAL	<u>9</u> , <u>11</u> (11 in combination with 4, 5, 6, in tinted lenses, advisable)
FURNACE OPERATIONS	GLARE, HEAT, MOLTEN METAL	<u>7</u> , <u>8</u> , <u>9</u> (for severe exposure add <u>10</u>)
GRINDING-LIGHT	FLYING PARTICLES	<u>1</u> , <u>3</u> , <u>4</u> , <u>5</u> , <u>6</u> , <u>10</u>
GRINDING-HEAVY	FLYING PARTICLES	<u>1</u> , <u>3</u> , <u>7A</u> , <u>8A</u> (for severe exposure add 10)
LABORATORY	CHEMICAL SPLASH, GLASS BREAKAGE	<u>2</u> (10 when in combination with <u>4</u> , <u>5</u> , <u>6</u>)
MACHINING	FLYING PARTICLES	<u>1</u> , <u>3</u> , <u>4</u> , <u>5</u> , <u>6</u> , <u>10</u>
MOLTEN METALS	HEAT, GLARE, SPARKS, SPLASH	<u>7</u> , <u>8</u> (10 in combination with <u>4</u> , <u>5</u> , <u>6</u> , in tinted lenses)
SPOT WELDING	FLYING PARTICLES, SPARKS	<u>1</u> , <u>3</u> , <u>4</u> , <u>5</u> , <u>6</u> , <u>10</u>

(2) Protection against radiant energy. (a) Selection of shade numbers for welding filter. Table C-2 shall be used as a guide for the selection of the proper shade numbers of filter lenses or plates used in welding. Shades more dense than those listed may be used to suit the individual's needs.

TABLE C-2

FILTER LENS SHADE NUMBERS FOR PROTECTION AGAINST RADIANT ENERGY

Welding Operation	Shade number
Shielded metal-arc welding 1/16-, 3/32-, 1/8-, 5/32-inch diameter electrodes	10
Gas-shielded arc welding (nonferrous) 1/16-, 3/32-, 1/8-, 5/32-inch diameter electrodes	11
Gas-shielded arc welding (ferrous) 1/16-, 3/32-, 1/8-, 5/32-inch diameter electrodes	12
Shielded metal-arc welding 3/16-, 7/32-, 1/4- inch diameter electrodes	12
5/16-, 3/8-inch diameter electrodes	14

Atomic hydrogen welding	10-14
Carbon-arc welding	14
Soldering	2
Torch brazing	3 or 4
Light cutting, up to 1 inch	3 or 4
Medium cutting, 1 inch to 6 inches	4 or 5
Heavy cutting, over 6 inches	5 or 6
Gas welding (light), up to 1/8-inch	4 or 5
Gas welding (medium), 1/8-inch to 1/2-inch	5 or 6
Gas welding (heavy), over 1/2-inch	6 or 9

(b) Laser protection.

(i) Employees whose occupation or assignment requires potentially hazardous exposure (see WAC 296-62-09005(4)) to laser radiation shall wear suitable laser safety goggles which will protect for the specific wavelength of the laser and be of optical density (O.D.) adequate for the energy involved. Table C-3 lists the maximum power or energy density for which adequate protection is afforded by glasses of optical densities from 5 through 8.

TABLE C-3
SELECTING LASER SAFETY GLASS

INTENSITY	ATTENUATION	
	Optical density (O.D.)	Attenuation factor
CW maximum power density (watts/cm ²)		
10 ⁻²	5	10 ⁵
10 ⁻¹	6	10 ⁶
1.0	7	10 ⁷
10.0	8	10 ⁸

Output levels falling between lines in this table shall require the higher optical density.

(ii) All protective goggles shall bear a label identifying the following data:

- (a) The laser wavelengths for which use is intended;
- (b) The optical density of those wavelengths.
- (c) The visible light transmission.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-215, filed 7/20/94, effective 9/20/94. Statutory Authority: RCW 49.17.040 and 49.17.050. 85-01-022 (Order 84-24), § 296-155-215, filed 12/11/84; Order 74-26, § 296-155-215, filed 5/7/74, effective 6/6/74.]

WAC 296-155-220 Respiratory protection. General.

In emergencies, or when controls required by Part B of this chapter either fail or are inadequate to prevent harmful exposure to employees, appropriate respiratory protective devices shall be provided by the employer and shall be used in accordance with WAC 296-62-071.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 83-15-017 (Order 83-19), § 296-155-220, filed 7/13/83, effective 9/12/83; Order 74-26, § 296-155-220, filed 5/7/74, effective 6/6/74.]

WAC 296-155-235 Working over or adjacent to water. (1) When an employee is employed under conditions which expose them to a risk of drowning, they shall wear a U.S. Coast Guard approved life saving device, unless it can

be shown that conditions, such as shallow water, are such that flotation would not be achieved.

(2) Prior to and after each use, the buoyant life saving device shall be inspected for defects which would alter their strength or buoyancy. Defective units shall not be used.

(3) Ring buoys with at least 90 feet of line shall be provided and readily available for emergency rescue operations. Distance between ring buoys shall not exceed 200 feet.

(4) At least one lifesaving skiff shall be immediately available at locations where employees are working over or adjacent to water. Each skiff, or skiffs, shall:

(a) Be suitable for conditions where used.

(b) Be equipped with oar locks securely attached to gunwales, oars, one boat hook, and one cork ring buoy with fifty feet of suitable line attached.

(5) Whenever boats or skiffs cannot be used, due to swift currents, life lines close to the water surface shall be provided and, wherever practicable, a line shall be stretched across the stream with tag lines.

(6) Where workers are transported by boat or barge, only such number of persons shall be carried that can be safely accommodated on fixed seats. Capacity showing number of persons shall be plainly marked on vessel.

(7) All workers shall be provided with a U.S. Coast Guard approved buoyant life saving device while transported in open boats and/or barges, and where deemed necessary by the department, workers shall wear same while in transport.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-235, filed 7/20/94, effective 9/20/94; Order 74-26, § 296-155-235, filed 5/7/74, effective 6/6/74.]

WAC 296-155-240 Sterilization of protective equipment. Goggles, gloves, respirators and other protectors shall not be interchanged among employees for use unless they have been thoroughly cleaned since last use.

[Order 74-26, § 296-155-240, filed 5/7/74, effective 6/6/74.]

**PART C-1
FALL RESTRAINT AND FALL ARREST**

WAC 296-155-245 Reserve.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-24-051, § 296-155-245, filed 11/27/96, effective 2/1/97. Statutory Authority: Chapter 49.17 RCW. 95-10-016, § 296-155-245, filed 4/25/95, effective 10/1/95.]

WAC 296-155-24501 Scope and application. This section sets forth requirements for employers to provide and enforce the use of fall protection for employees in construction, alteration, repair, maintenance (including painting and decorating), demolition workplaces, and material handling covered under chapter 296-155 WAC.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-24-051, § 296-155-24501, filed 11/27/96, effective 2/1/97. Statutory Authority: Chapter 49.17 RCW. 95-10-016, § 296-155-24501, filed 4/25/95, effective 10/1/95; 91-03-044 (Order 90-18), § 296-155-24501, filed 1/10/91, effective 2/12/91.]

WAC 296-155-24503 Definitions. Anchorage means a secure point of attachment for lifelines, lanyards, or

deceleration devices which is capable of withstanding the forces specified in the applicable sections of chapter 296-155 WAC.

Approved means, for the purpose of this section; tested and certified by the manufacturer, or any recognized national testing laboratory, to possess the strength requirements specified in this section.

Body belt means a Type 1 safety belt used in conjunction with lanyard or lifeline for fall restraint only.

Full body harness means a configuration of connected straps to distribute a fall arresting force over at least the thighs, shoulders and pelvis, with provisions for attaching a lanyard, lifeline, or deceleration devices.

Full body harness system means a Class III full body harness and lanyard which is attached to an anchorage meeting the requirements of chapter 296-155 WAC, Part C-1; or attached to a horizontal or vertical lifeline which is properly secured to an anchorage(s) capable of withstanding the forces specified in the applicable sections of chapter 296-155 WAC.

Catenary line - see horizontal lifeline.

Competent person means an individual knowledgeable of fall protection equipment, including the manufacturers recommendations and instructions for the proper use, inspection, and maintenance; and who is capable of identifying existing and potential fall hazards; and who has the authority to take prompt corrective action to eliminate those hazards; and who is knowledgeable of the rules contained in this section regarding the erection, use, inspection, and maintenance of fall protection equipment and systems.

Connector means a device which is used to couple (connect) parts of the personal fall arrest system and positioning device systems together. It may be an independent component of the system, such as a carabiner, or it may be an integral component of part of the system (such as a buckle or dee ring sewn into a body belt or body harness, or a snap hook spliced or sewn to a lanyard or self-retracting lanyard).

Continuous fall protection means the design and use of a fall protection system such that no exposure to an elevated fall hazard occurs. This may require more than one fall protection system or a combination of prevention or protection measures.

Control zone means the area between the warning line and the unprotected sides and edges of the walking/working surface.

Deceleration device means any mechanism, such as a rope grab, ripstitch lanyard, specifically woven lanyard, tearing or deforming lanyards, automatic self-retracting lifelines/lanyards, etc., which serves to dissipate a substantial amount of energy during a fall arrest, or otherwise limit the energy imposed on an employee during fall arrest.

Deceleration distance means the additional vertical distance a falling employee travels, excluding lifeline elongation and free fall distance, before stopping, from the point at which the deceleration device begins to operate. It is measured as the distance between the location of an employee's body belt or body harness attachment point at the moment of activation (at the onset of fall arrest forces) of the deceleration device during a fall, and the location of that attachment point after the employee comes to a full stop.

Drop line means a vertical lifeline secured to an upper anchorage for the purpose of attaching a lanyard or device.

Failure means load refusal, breakage, or separation of component parts. Load refusal is the point where the ultimate strength is exceeded.

Fall arrest system means the use of multiple, approved safety equipment components such as; body harnesses, lanyards, deceleration devices, droplines, horizontal and/or vertical lifelines and anchorages, interconnected and rigged as to arrest a free fall. Compliance with anchorage strength requirements specified in the applicable sections of chapter 296-155 WAC, Part C-1 shall constitute approval of the anchorage.

Fall protection work plan means a written planning document in which the employer identifies all areas on the job site where a fall hazard of 10 feet or greater exists. The plan describes the method or methods of fall protection to be utilized to protect employees, and includes the procedures governing the installation use, inspection, and removal of the fall protection method or methods which are selected by the employer. (See WAC 296-155-24505.)

Fall restraint system means an approved device and any necessary components that function together to restrain an employee in such a manner as to prevent that employee from falling to a lower level. When standard guardrails are selected, compliance with applicable sections governing their construction and use shall constitute approval.

Fall distance means the actual distance from the worker's support to the level where a fall would stop.

Free fall means the act of falling before a personal fall arrest system begins to apply force to arrest the fall.

Free fall distance means the vertical displacement of the fall arrest attachment point on the employee's body belt or body harness between onset of the fall and just before the system begins to apply force to arrest the fall. This distance excludes deceleration distance, and lifeline/lanyard elongation, but includes any deceleration device slide distance or self-retracting lifeline/lanyard extension before they operate and fall arrest forces occur.

Hardware means snap hooks, D rings, bucklers, carabiners, adjusters, O rings, that are used to attach the components of a fall protection system together.

Horizontal lifeline means a rail, rope, wire, or synthetic cable that is installed in a horizontal plane between two anchorages and used for attachment of a worker's lanyard or lifeline device while moving horizontally; used to control dangerous pendulum like swing falls.

Lanyard means a flexible line of webbing, rope, or cable used to secure a body belt or harness to a lifeline or an anchorage point usually 2, 4, or 6 feet long.

Leading edge means the advancing edge of a floor, roof, or formwork which changes location as additional floor, roof, or formwork sections are placed, formed, or constructed. Leading edges not actively under construction are considered to be "unprotected sides and edges," and positive methods of fall arrest or fall restraint shall be required to protect exposed workers.

Lifeline means a vertical line from a fixed anchorage or between two horizontal anchorages, independent of walking or working surfaces, to which a lanyard or device is secured. Lifeline as referred to in this text is one which is part of a

fall protection system used as back-up safety for an elevated worker.

Locking snap hook means a connecting snap hook that requires two separate forces to open the gate; one to deactivate the gatekeeper and a second to depress and open the gate which automatically closes when released; used to minimize roll out or accidental disengagement.

Low pitched roof means a roof having a slope equal to or less than 4 in 12.

Mechanical equipment means all motor or human propelled wheeled equipment except for wheelbarrows, mopcars, robotic thermoplastic welders and robotic crimpers.

Positioning belt means a single or multiple strap that can be secured around the worker's body to hold the user in a work position; for example, a lineman's belt, a rebar belt, or saddle belt.

Positioning device system means a body belt or body harness system rigged to allow an employee to be supported on an elevated vertical surface, such as a wall, and work with both hands free while leaning.

Restraint line means a line from a fixed anchorage or between two anchorages to which an employee is secured in such a way as to prevent the worker from falling to a lower level.

Roll out means unintentional disengagement of a snap hook caused by the gate being depressed under torque or contact while twisting or turning; a particular concern with single action snap hooks that do not have a locking gatekeeper.

Roof means the exterior surface on the top of a building. This does not include floors or form work which, because a building has not been completed, temporarily become the top surface of a building.

Roofing work means the hoisting, storage, application, and removal of roofing materials and equipment, including related insulation, sheet metal, and vapor barrier work, but not including the construction of the roof deck.

Rope grab means a fall arrester that is designed to move up or down a lifeline suspended from a fixed overhead or horizontal anchorage point, or lifeline, to which the belt or harness is attached. In the event of a fall, the rope grab locks onto the lifeline rope through compression to arrest the fall. The use of a rope grab device is restricted for all restraint applications. (Refer to WAC 296-155-24510 (1)(b)(iii)).

Safety line - see lifeline.

Safety monitor system means a system of fall restraint used in conjunction with a warning line system only, where a competent person as defined by this part, having no additional duties, monitors the proximity of workers to the fall hazard when working between the warning line and the unprotected sides and edges including, the leading edge of a low pitched roof or walking/working surface.

Self retracting lifeline means a deceleration device which contains a drum wound line which may be slowly extracted from, or retracted onto, the drum under slight tension during normal employee movement, and which after onset of a fall, automatically locks the drum and arrests the fall.

Shock absorbing lanyard means a flexible line of webbing, cable, or rope used to secure a body belt or harness

to a lifeline or anchorage point that has an integral shock absorber.

Single action snap hook means a connecting snap hook that requires a single force to open the gate which automatically closes when released.

Snap hook means a self-closing connecting device with a gatekeeper latch or similar arrangement that will remain closed until manually opened. This includes single action snap hooks that open when the gatekeeper is depressed and double action snap hooks that require a second action on a gatekeeper before the gate can be opened.

Static line - see horizontal lifeline.

Strength member means any component of a fall protection system that could be subject to loading in the event of a fall.

Steep roof means a roof having a slope greater than 4 in 12.

Unprotected sides and edges means any side or edge (except at entrances to points of access) of a floor, roof, ramp or runway where there is no wall or guardrail system as defined in WAC 296-155-505(5).

Walking/working surface means for the purpose of this section, any area whose dimensions are 45 inches or greater in all directions, through which workers pass or conduct work.

Warning line system means a barrier erected on a walking and working surface or a low pitch roof (4 in 12 or less), to warn employees that they are approaching an unprotected fall hazard(s).

Work area means that portion of a walking/working surface where job duties are being performed.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-24-051, § 296-155-24503, filed 11/27/96, effective 2/1/97. Statutory Authority: Chapter 49.17 RCW. 95-10-016, § 296-155-24503, filed 4/25/95, effective 10/1/95; 91-03-044 (Order 90-18), § 296-155-24503, filed 1/10/91, effective 2/12/91.]

WAC 296-155-24505 Fall protection work plan. (1) The employer shall develop and implement a written fall protection work plan including each area of the work place where the employees are assigned and where fall hazards of 10 feet or more exist.

(2) The fall protection work plan shall:

(a) Identify all fall hazards in the work area.

(b) Describe the method of fall arrest or fall restraint to be provided.

(c) Describe the correct procedures for the assembly, maintenance, inspection, and disassembly of the fall protection system to be used.

(d) Describe the correct procedures for the handling, storage, and securing of tools and materials.

(e) Describe the method of providing overhead protection for workers who may be in, or pass through the area below the work site.

(f) Describe the method for prompt, safe removal of injured workers.

(g) Be available on the job site for inspection by the department.

(3) Prior to permitting employees into areas where fall hazards exist the employer shall:

(a) Ensure that employees are trained and instructed in the items described in subsection (2)(a) through (f) of this section.

(b) Inspect fall protection devices and systems to ensure compliance with WAC 296-155-24510.

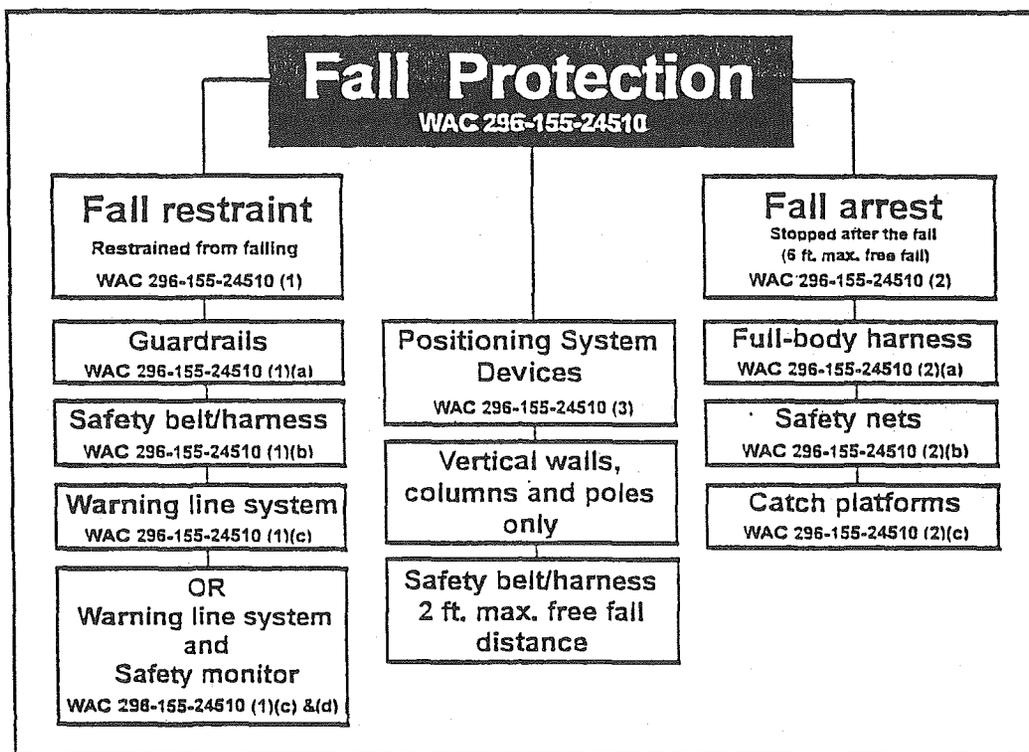
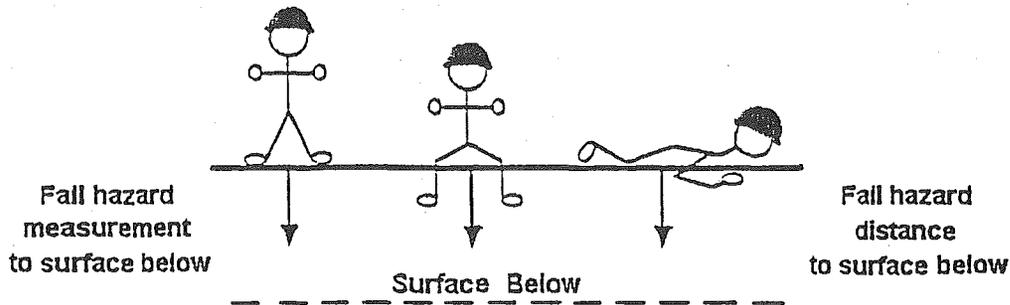
(4) Training of employees as required by this section shall be documented and shall be available on the job site.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-24-051, § 296-155-24505, filed 11/27/96, effective 2/1/97. Statutory Authority: Chapter 49.17 RCW. 95-10-016, § 296-155-24505, filed 4/25/95, effective 10/1/95; 91-03-044 (Order 90-18), § 296-155-24505, filed 1/10/91, effective 2/12/91.]

WAC 296-155-24507 Reserve.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-24-051, § 296-155-24507, filed 11/27/96, effective 2/1/97. Statutory Authority: Chapter 49.17 RCW. 95-10-016, § 296-155-24507, filed 4/25/95, effective 10/1/95.]

WAC 296-155-24510 Fall restraint, fall arrest systems. When employees are exposed to a hazard of falling from a location 10 feet or more in height, the employer shall ensure that fall restraint, fall arrest systems or positioning device systems are provided, installed, and implemented according to the following requirements.



- (1) Fall restraint protection shall consist of:
 - (a) Standard guardrails as described in chapter 296-155 WAC, Part K.
 - (b) Safety belts and/or harness attached to securely rigged restraint lines.
 - (i) Safety belts and/or harness shall conform to ANSI Standard:
 - Class I body belt

- Class II chest harness
- Class III full body harness
- Class IV suspension/position belt
- (ii) All safety belt and lanyard hardware assemblies shall be capable of withstanding a tensile loading of 4,000 pounds without cracking, breaking, or taking a permanent deformation.

(iii) Rope grab devices are prohibited for fall restraint applications unless they are part of a fall restraint system designed specifically for the purpose by the manufacturer, and used in strict accordance with the manufacturer's recommendations and instructions.

(iv) The employer shall ensure component compatibility.

(v) Components of fall restraint systems shall be inspected prior to each use for mildew, wear, damage, and other deterioration, and defective components shall be removed from service if their function or strength have been adversely affected.

(vi) Anchorage points used for fall restraint shall be capable of supporting 4 times the intended load.

(vii) Restraint protection shall be rigged to allow the movement of employees only as far as the sides and edges of the walking/working surface.

(c) A warning line system as prescribed in WAC 296-155-24515(3) and supplemented by the use of a safety monitor system as prescribed in WAC 296-155-24521 to protect workers engaged in duties between the forward edge of the warning line and the unprotected sides and edges, including the leading edge, of a low pitched roof or walking/working surface.

(d) Warning line and safety monitor systems as described in WAC 296-155-24515 (3) through (4)(f) and WAC 296-155-24520 respectively are prohibited on surfaces exceeding a 4 in 12 pitch, and on any surface whose dimensions are less than 45 inches in all directions.

(2) Fall arrest protection shall consist of:

(a) Full body harness system.

(i) An approved Class III full body harness shall be used.

(ii) Body harness systems or components subject to impact loading shall be immediately removed from service and shall not be used again for employee protection unless inspected and determined by a competent person to be undamaged and suitable for reuse.

(iii) All safety lines and lanyards shall be protected against being cut or abraded.

(iv) The attachment point of the body harness shall be located in the center of the wearer's back near shoulder level, or above the wearer's head.

(v) Body harness systems shall be rigged to minimize free fall distance with a maximum free fall distance allowed of 6 feet, and such that the employee will not contact any lower level.

(vi) Hardware shall be drop forged, pressed or formed steel, or made of materials equivalent in strength.

(vii) Hardware shall have a corrosion resistant finish,

and all surfaces and edges shall be smooth to prevent damage to the attached body harness or lanyard.

(viii) When vertical lifelines (droplines) are used, not more than one employee shall be attached to any one lifeline.

Note: The system strength needs in the following items are based on a total combined weight of employee and tools of no more than 310 pounds. If combined weight is more than 310 pounds, appropriate allowances must be made or the system will not be deemed to be in compliance.

(ix) Full body harness systems shall be secured to anchorages capable of supporting 5,000 pounds per employee except: When self retracting lifelines or other deceleration devices are used which limit free fall to two feet, anchorages shall be capable of withstanding 3,000 pounds.

(x) Vertical lifelines (droplines) shall have a minimum tensile strength of 5,000 pounds (22.2 kN), except that self retracting lifelines and lanyards which automatically limit free fall distance to two feet (.61 m) or less shall have a minimum tensile strength of 3,000 pounds (13.3 kN).

(xi) Horizontal lifelines shall have a tensile strength capable of supporting a fall impact load of at least 5,000 pounds (22.2 kN) per employee using the lifeline, applied anywhere along the lifeline.

(xii) Lanyards shall have a minimum tensile strength of 5,000 pounds (22.2 kN).

(xiii) All components of body harness systems whose strength is not otherwise specified in this subsection shall be capable of supporting a minimum fall impact load of 5,000 pounds (22.2 kN) applied at the lanyard point of connection.

(xiv) Snap hooks shall not be connected to loops made in webbing type lanyards.

(xv) Snap hooks shall not be connected to each other.

(xvi) Not more than one snap hook shall be connected to any one D ring unless they are the double locking type.

(xvii) Full body harness systems shall be inspected prior to each use for mildew, wear, damage, and other deterioration, and defective components shall be removed from service if their function or strength have been adversely affected.

(b) Safety net systems. Safety net systems and their use shall comply with the following provisions:

(i) Safety nets shall be installed as close as practicable under the surface on which employees are working, but in no case more than 30 feet (9.1 m) below such level unless specifically approved in writing by the manufacturer. The potential fall area to the net shall be unobstructed.

(ii) Safety nets shall extend outward from the outermost projection of the work surface as follows:

Vertical distance from working level to horizontal plane of net	Minimum required horizontal distance of outer edge of net from the edge of the working surface
Up to 5 feet	8 feet
More than 5 feet up to 10 feet	10 feet
More than 10 feet	13 feet

(iii) Safety nets shall be installed with sufficient clearance under them to prevent contact with the surface or structures below when subjected to an impact force equal to the drop test specified in (b)(iv) of this subsection.

(iv) Safety nets and their installations shall be capable of absorbing an impact force equal to that produced by the drop test specified in (b)(iv)(A) and (B) of this subsection.

(A) Except as provided in (b)(iv)(B) of this subsection, safety nets and safety net installations shall be drop-tested at the job site after initial installation and before being used as a fall protection system, whenever relocated, after major repair, and at 6-month intervals if left in one place. The drop-test shall consist of a 400 pound (180 kg) bag of sand 30 ± 2 inches (76 ± 5 cm) in diameter dropped into the net from the highest walking/working surface at which employees are exposed to fall hazards, but not from less than 42 inches (1.1 m) above that level.

(B) When the employer can demonstrate that it is unreasonable to perform the drop-test required by (b)(iv)(A) of this subsection, the employer (or a designated competent person) shall certify that the net and net installation is in compliance with the provisions of (b)(iii) and (b)(iv)(A) of this subsection by preparing a certification record prior to the net being used as a fall protection system. The certification record must include an identification of the net and net installation for which the certification record is being prepared; the date that it was determined that the identified net and net installation were in compliance with (b)(iii) of this subsection and the signature of the person making the determination and certification. The most recent certification record for each net and net installation shall be available at the job site for inspection.

(v) Defective nets shall not be used. Safety nets shall be inspected at least once a week for wear, damage, and other deterioration. Defective components shall be removed from service. Safety nets shall also be inspected after any occurrence which could affect the integrity of the safety net system.

(vi) Materials, scrap pieces, equipment, and tools which have fallen into the safety net shall be removed as soon as possible from the net and at least before the next work shift.

(vii) The maximum size of each safety net mesh opening shall not exceed 36 square inches (230 cm²) nor be longer than 6 inches (15 cm) on any side, and the opening, measured center-to-center of mesh ropes or webbing, shall not be longer than 6 inches (15 cm). All mesh crossings shall be secured to prevent enlargement of the mesh opening.

(viii) Each safety net (or section of it) shall have a border rope for webbing with an minimum breaking strength of 5,000 pounds (22.2 kN).

(ix) Connections between safety net panels shall be as strong as integral net components and shall be spaced not more than 6 inches (15 cm) apart.

(c) Catch platforms.

(i) A catch platform shall be installed within 10 vertical feet of the work area.

(ii) The catch platforms width shall equal the distance of the fall but shall be a minimum of 45 inches wide and shall be equipped with standard guardrails on all open sides.

(3) Positioning device systems. Positioning device systems and their use shall conform to the following provisions:

(a) Positioning devices shall be rigged such that an employee cannot free fall more than 2 feet (.61 m).

(b) Positioning devices shall be secured to an anchorage capable of supporting at least twice the potential impact load of an employee's fall or 3,000 pounds (13.3 kN), whichever is greater.

(c) Connectors shall be drop forged, pressed or formed steel, or made of equivalent materials.

(d) Connectors shall have a corrosion-resistant finish, and all surfaces and edges shall be smooth to prevent damage to interfacing parts of this system.

(e) Connecting assemblies shall have a minimum tensile strength of 5,000 pounds (22.2 kN).

(f) Dee-rings and snap-hooks shall be proof-tested to a minimum tensile load of 3,600 pounds (16 kN) without cracking, breaking, or taking permanent deformation.

(g) Snap-hooks shall be sized to be compatible with the member to which they are connected to prevent unintentional disengagement of the snap-hook by depression of the snap-hook keeper by the connected member, or shall be a locking type snap-hook designed and used to prevent disengagement of the snap-hook by the contact of the snap-hook keeper by the connected member. As of January 1, 1998, only locking type snap-hooks shall be used.

(h) Unless the snap-hook is a locking type and designed for the following connections, snap-hooks shall not be engaged:

(i) Directly to webbing, rope or wire rope;

(ii) To each other;

(iii) To a dee-ring to which another snap-hook or other connector is attached;

(iv) To a horizontal lifeline; or

(v) To any object which is incompatibly shaped or dimensioned in relation to the snap-hook such that unintentional disengagement could occur by the connected object being able to depress the snap-hook keeper and release itself.

(i) Positioning device systems shall be inspected prior to each use for wear, damage, and other deterioration, and defective components shall be removed from service.

(j) Body belts, harnesses, and components shall be used only for employee protection (as part of a personal fall arrest system or positioning device system) and not to hoist materials.

(4) Droplines or lifelines used on rock scaling operations, or in areas where the lifeline may be subjected to cutting or abrasion, shall be a minimum of 7/8 inch wire core manila rope. For all other lifeline applications, a minimum of 3/4 inch manila or equivalent, with a minimum breaking strength of 5,000 pounds, shall be used.

(5) Safety harnesses, lanyards, lifelines or droplines, independently attached or attended, shall be used while performing the following types of work when other equivalent type protection is not provided:

(a) Work performed in permit required confined spaces and other confined spaces shall follow the procedures as described in chapter 296-62 WAC, Part M.

(b) Work on hazardous slopes, or dismantling safety nets, working on poles or from boatswains chairs at elevations greater than six feet (1.83 m), swinging scaffolds or other unguarded locations.

(c) Work on skips and platforms used in shafts by crews when the skip or cage does not occlude the opening to

within one foot (30.5 cm) of the sides of the shaft, unless cages are provided.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-24-051, § 296-155-24510, filed 11/27/96, effective 2/1/97. Statutory Authority: Chapter 49.17 RCW. 95-10-016, § 296-155-24510, filed 4/25/95, effective 10/1/95; 95-04-007, § 296-155-24510, filed 1/18/95, effective 3/1/95; 93-19-142 (Order 93-04), § 296-155-24510, filed 9/22/93, effective 11/1/93; 91-24-017 (Order 91-07), § 296-155-24510, filed 11/22/91, effective 12/24/91; 91-03-044 (Order 90-18), § 296-155-24510, filed 1/10/91, effective 2/12/91.]

WAC 296-155-24515 Guarding of low pitched roof perimeters. (1) General provisions. During the performance of work on low pitched roofs with a potential fall hazard greater than 10 feet, the employer shall ensure that employees engaged in such work be protected from falling from all unprotected sides and edges of the roof as follows:

(a) By the use of a fall restraint or fall arrest systems, as defined in WAC 296-155-24510; or

(b) By the use of a warning line system erected and maintained as provided in subsection (3) of this section and supplemented for employees working between the warning line and the roof edge by the use of a safety monitor system as described in WAC 296-155-24521.

(c) Mechanical equipment shall be used or stored only in areas where employees are protected by a warning line system, or fall restraint, or fall arrest systems as described in WAC 296-155-24510. Mechanical equipment may not be used or stored where the only protection is provided by the use of a safety monitor.

(2) Exceptions.

(a) The provisions of subsection (1)(a) of this section do not apply at points of access such as stairways, ladders, and ramps, or when employees are on the roof only to inspect, investigate, or estimate roof level conditions. Roof edge materials handling areas and materials storage areas shall be guarded as provided in subsection (4) of this section.

(b) Employees engaged in roofing on low-pitched roofs less than 50 feet wide, may elect to use a safety monitor system without warning lines.

(3) Warning lines systems.

(a) Warning lines shall be erected around all sides of the work area.

(i) When mechanical equipment is not being used, the warning line shall be erected not less than six feet (1.8 meters) from the edge of the roof.

(ii) When mechanical equipment is being used, the warning line shall be erected not less than six feet (1.8 meters) from the roof edge which is parallel to the direction of mechanical equipment operation, and not less than 10 feet (3.1 meters) from the roof edge which is perpendicular to the direction of mechanical equipment operation.

(b) The warning line shall consist of a rope, wire, or chain and supporting stanchions erected as follows:

(i) The rope, wire, or chain shall be flagged at not more than six foot (1.8 meter) intervals with high visibility material.

(ii) The rope, wire, or chain shall be rigged and supported in such a way that its lowest point (including sag) is no less than 36 inches (91.4 cm) from the roof surface and its highest point is no more than 42 inches (106.7 cm) from the roof surface.

(iii) After being erected, with the rope, wire or chain attached, stanchions shall be capable of resisting, without tipping over, a force of at least 16 pounds (71 Newtons) applied horizontally against the stanchion, 30 inches (0.76 meters) above the roof surface, perpendicular to the warning line, and in the direction of the roof edge.

(iv) The rope, wire, or chain shall have a minimum tensile strength of 200 pounds (90 kilograms), and after being attached to the stanchions, shall be capable of supporting, without breaking, the loads applied to the stanchions.

(v) The line shall be attached at each stanchion in such a way that pulling on one section of the line between stanchions will not result in slack being taken up in adjacent sections before the stanchion tips over.

(c) Access paths shall be erected as follows:

(i) Points of access, materials handling areas, and storage areas shall be connected to the work area by a clear access path formed by two warning lines.

(ii) When the path to a point of access is not in use, a rope, wire, or chain, equal in strength and height to the warning line, shall be placed across the path at the point where the path intersects the warning line erected around the work area.

(4) Roof edge materials handling areas and materials storage. Employees working in a roof edge materials handling or materials storage area located on a low pitched roof with a ground to eave height greater than 10 feet shall be protected from falling along all unprotected roof sides and edges of the area.

(a) When guardrails are used at hoisting areas, a minimum of four feet of guardrail shall be erected on each side of the access point through which materials are hoisted.

(b) A chain or gate shall be placed across the opening between the guardrail sections when hoisting operations are not taking place.

(c) When guardrails are used at bitumen pipe outlet, a minimum of four feet of guardrail shall be erected on each side of the pipe.

(d) When safety belt/harness systems are used, they shall not be attached to the hoist.

(e) When fall restraint systems are used, they shall be rigged to allow the movement of employees only as far as the roof edge.

(f) Materials shall not be stored within six feet of the roof edge unless guardrails are erected at the roof edge.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-24-051, § 296-155-24515, filed 11/27/96, effective 2/1/97. Statutory Authority: Chapter 49.17 RCW. 95-10-016, § 296-155-24515, filed 4/25/95, effective 10/1/95; 91-24-017 (Order 91-07), § 296-155-24515, filed 11/22/91, effective 12/24/91; 91-03-044 (Order 90-18), § 296-155-24515, filed 1/10/91, effective 2/12/91.]

WAC 296-155-24519 Reserve.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-24-051, § 296-155-24519, filed 11/27/96, effective 2/1/97. Statutory Authority: Chapter 49.17 RCW. 95-10-016, § 296-155-24519, filed 4/25/95, effective 10/1/95.]

WAC 296-155-24520 Leading edge control zone.

(1) When performing leading edge work, the employer shall ensure that a control zone be established according to the following requirements:

(a) The control zone shall begin a minimum of 6 feet back from the leading edge to prevent exposure by employees who are not protected by fall restraint or fall arrest systems.

(b) The control zone shall be separated from other areas of the low pitched roof or walking/working surface by the erection of a warning line system.

(c) The warning line system shall consist of wire, rope, or chain supported on stanchions, or a method which provides equivalent protection.

(d) The spacing of the stanchions and support of the line shall be such that the lowest point of the line (including sag) is not less than 36 inches from the walking/working surface, and its highest point is not more than 42 inches (106.7 cm) from the walking/working surface.

(e) Each line shall have a minimum tensile strength of 200 pounds (90 kilograms).

(f) Each line shall be flagged or clearly marked with high visibility materials at intervals not to exceed 6 feet.

(g) After being erected with the rope, or chain attached, stanchions shall be capable of resisting without tipping over, a force of at least 16 pounds (71 Newtons) applied horizontally against the stanchions 30 inches (0.76 meters) above the roof surface, perpendicular to the warning line and in the direction of the roof edge.

(2) When positive means of fall restraint as described in WAC 296-155-24510 (1)(a) through (d), or fall arrest as described in WAC 296-155-24510 (2) through (5)(c) are not utilized, a safety monitor system as described in WAC 296-155-24521 shall be implemented to protect employees working between the forward edge of the warning line and the leading edge.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-24-051, § 296-155-24520, filed 11/27/96, effective 2/1/97. Statutory Authority: Chapter 49.17 RCW. 95-10-016, § 296-155-24520, filed 4/25/95, effective 10/1/95; 91-24-017 (Order 91-07), § 296-155-24520, filed 11/22/91, effective 12/24/91; 91-03-044 (Order 90-18), § 296-155-24520, filed 1/10/91, effective 2/12/91.]

WAC 296-155-24521 Safety monitor system. (1) A safety monitor system (SMS) may be used in conjunction with a warning line system as a method of guarding against falls during work on low pitched roofs and leading edge work only.

(2) When selected, the employer shall ensure that the safety monitor system shall be addressed in the fall protection work plan, include the name of the safety monitor(s) and the extent of their training in both the safety monitor and warning line systems, and shall ensure that the following requirements are met.

(3) The safety monitor system shall not be used when adverse weather conditions create additional hazards.

(4) A person acting in the capacity of safety monitor(s) shall be trained in the function of both the safety monitor and warning lines systems, and shall:

(a) Be a competent person as defined in WAC 296-155-24503.

(b) Have control authority over the work as it relates to fall protection.

(c) Be instantly distinguishable over members of the work crew.

(d) Engage in no other duties while acting as safety monitor.

(e) Be positioned in relation to the workers under their protection, so as to have a clear, unobstructed view and be able to maintain normal voice communication.

(f) Not supervise more than eight exposed workers at one time.

(5) Control zone workers shall be distinguished from other members of the crew by wearing highly visible, distinctive, and uniform apparel readily distinguishing them from other members of the crew only while in the control zone.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-24-051, § 296-155-24521, filed 11/27/96, effective 2/1/97. Statutory Authority: Chapter 49.17 RCW. 95-10-016, § 296-155-24521, filed 4/25/95, effective 10/1/95; 91-03-044 (Order 90-18), § 296-155-24521, filed 1/10/91, effective 2/12/91.]

WAC 296-155-24522 Reserve.

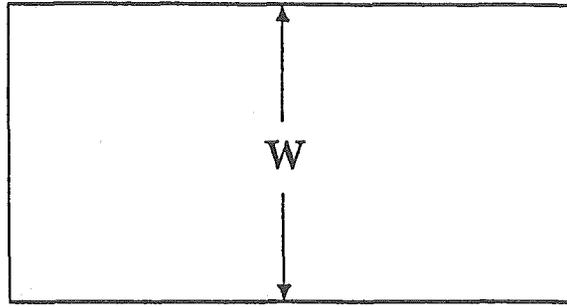
[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-24-051, § 296-155-24522, filed 11/27/96, effective 2/1/97. Statutory Authority: Chapter 49.17 RCW. 95-10-016, § 296-155-24522, filed 4/25/95, effective 10/1/95.]

WAC 296-155-24523 Appendix A to Part C-1—Determining roof widths nonmandatory guidelines for complying with WAC 296-155-24515 (2)(b). (1) This appendix serves as a guideline to assist employers complying with the requirements of WAC 296-155-24515 (2)(b). WAC 296-155-24515 (2)(b) allows the use of a safety monitoring system alone as a means of providing fall protection during the performance of roofing operations on low-sloped roofs 50 feet (15.25 m) or less in width. Each example in the appendix shows a roof plan or plans and indicates where each roof or roof area is to be measured to determine its width. Section views or elevation views are shown where appropriate. Some examples show "correct" and "incorrect" subdivisions of irregularly shaped roofs divided into smaller, regularly shaped areas. In all examples, the dimension selected to be the width of an area is the lesser of the two primary dimensions of the area, as viewed from above. Example A shows that on a simple rectangular roof, width is the lesser of the two primary overall dimensions. This is also the case with roofs which are sloped toward or away from the roof center, as shown in Example B.

(2) Many roofs are not simple rectangles. Such roofs may be broken down into subareas as shown in Example C. The process of dividing a roof area can produce many different configurations. Example C gives the general rule of using dividing lines of minimum length to minimize the size and number of the areas which are potentially less than 50 feet (15.25 m) wide. The intent is to minimize the number of roof areas where safety monitoring systems alone are sufficient protection.

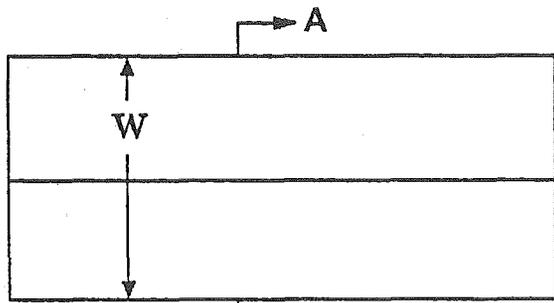
(3) Roofs which are comprised of several separate, non-contiguous roof areas, as in Example D, may be considered as a series of individual roofs. Some roofs have penthouses, additional floors, courtyard openings, or similar architectural features; Example E shows how the rule for dividing roofs into subareas is applied to such configurations. Irregular, non-rectangular roofs must be considered on an individual basis, as shown in Example F.

Example A
Rectangular Shaped Roof

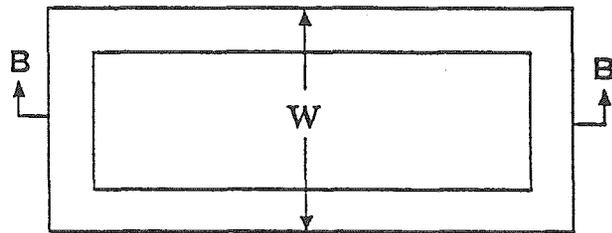


PLAN VIEW

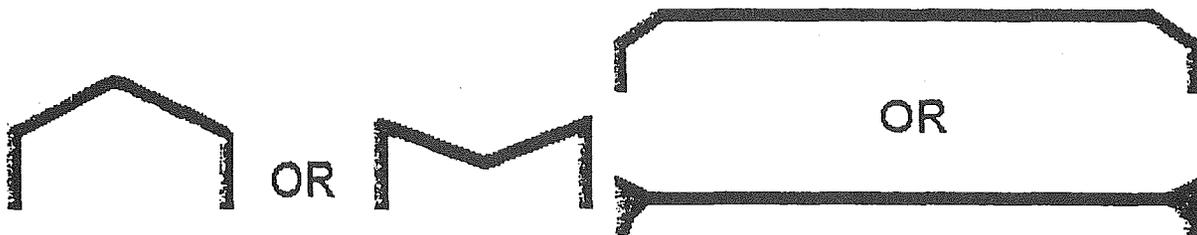
Example B
Sloped Rectangular Shaped Roofs



PLAN VIEW



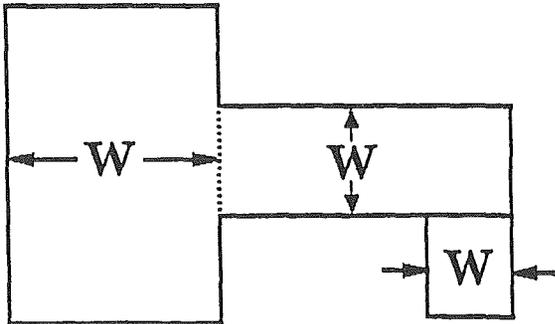
PLAN VIEW



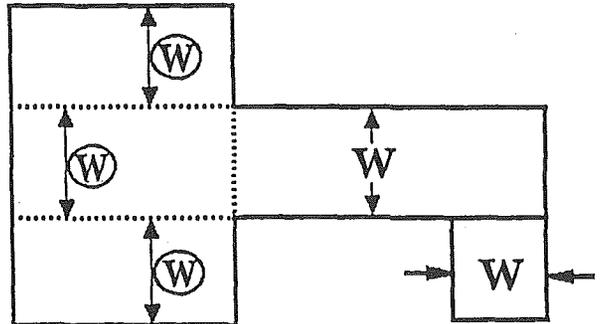
SECTION A-A

SECTION B-B

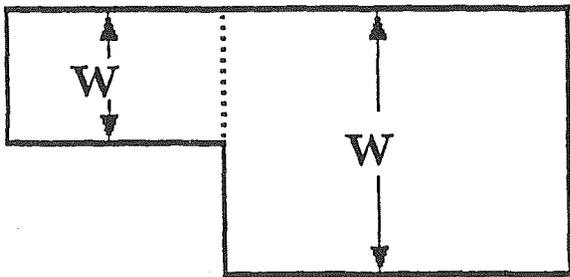
Example C
Irregularly Shaped Roofs With Rectangular Shaped Sections



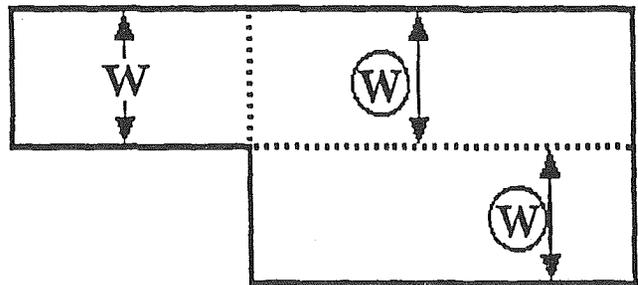
Correct



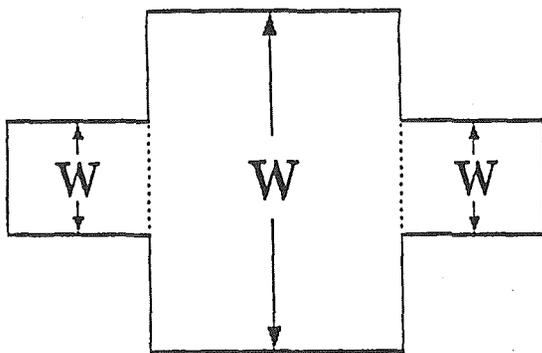
Incorrect



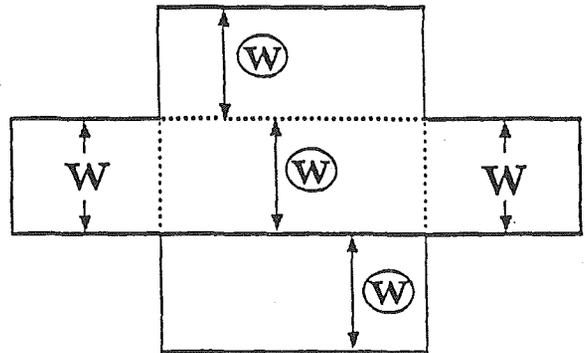
Correct



Incorrect



Correct

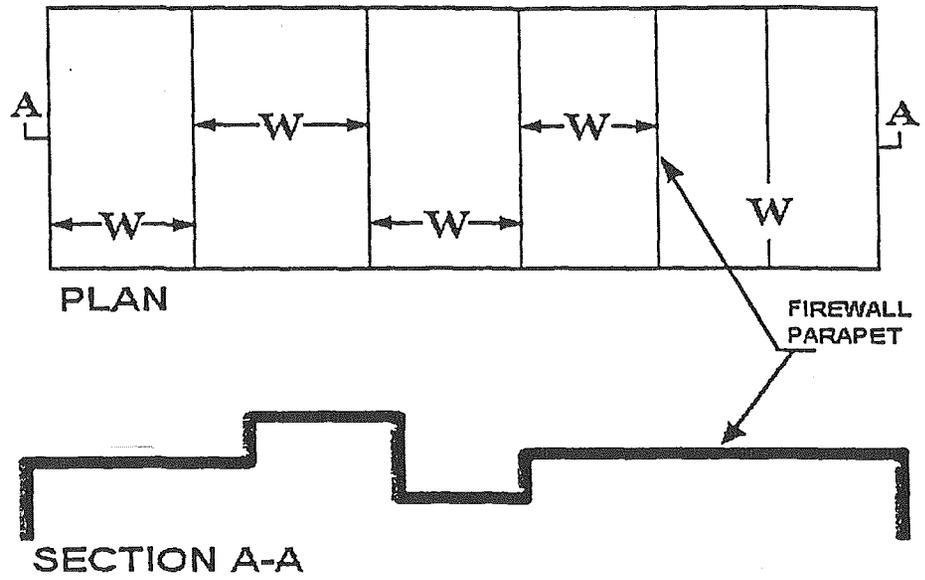


Incorrect

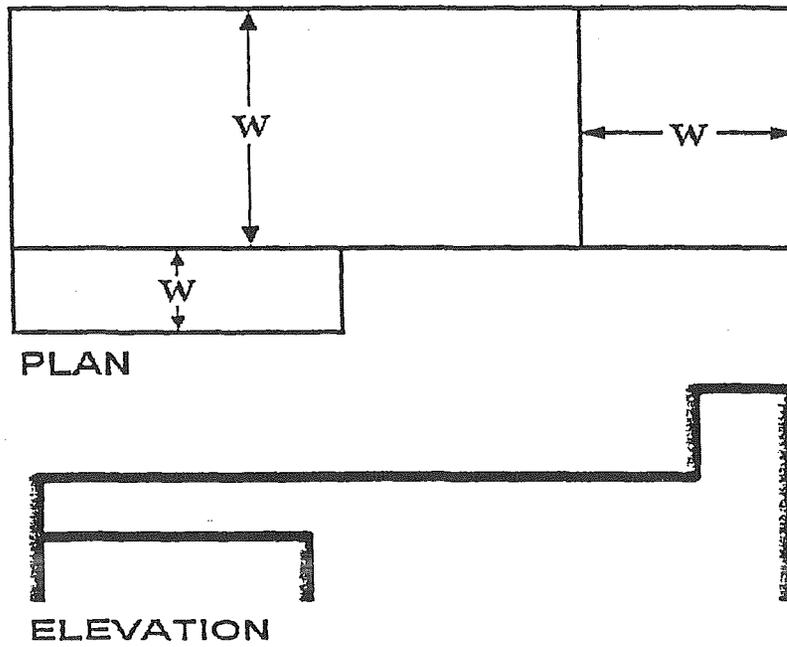
Such roofs are to be divided into subareas by using dividing lines of minimum length to minimize the size and number of the areas which are potentially less than or equal to 50 feet (15.25 m) in width, in order to limit the size of roof areas where the safety monitoring system alone can be used (WAC 296-155-24515(2)(b)). Dotted lines are used in the examples to show the location of dividing lines, (W) denotes incorrect measurements of width.

Example D
Separate, Non-Contiguous Roof Areas

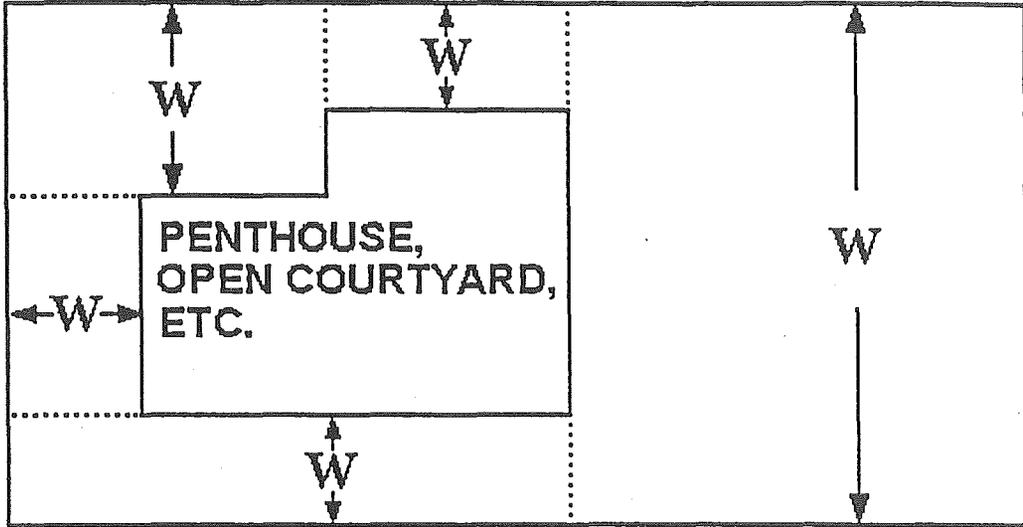
1.



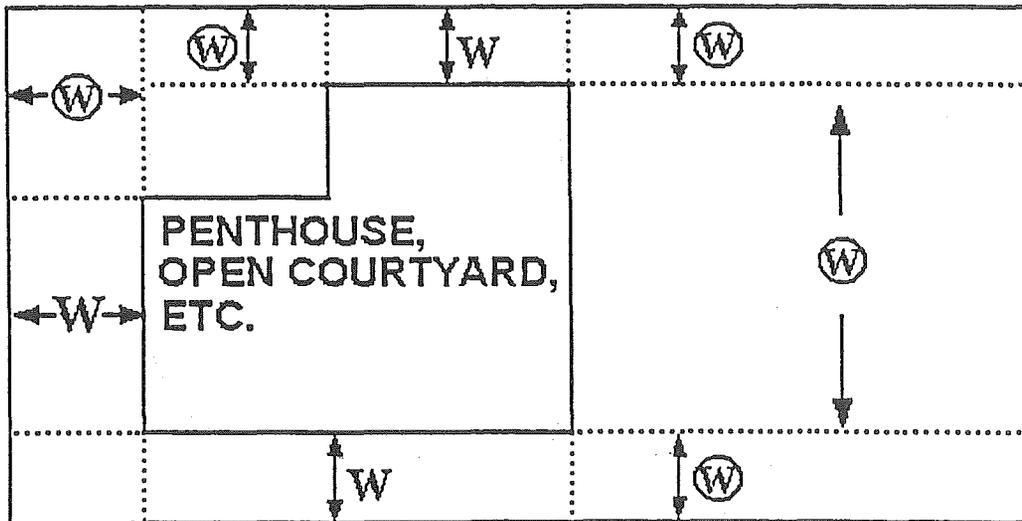
2.



Example E
Roofs With Penthouses, Open Courtyards, Additional Floors, etc.

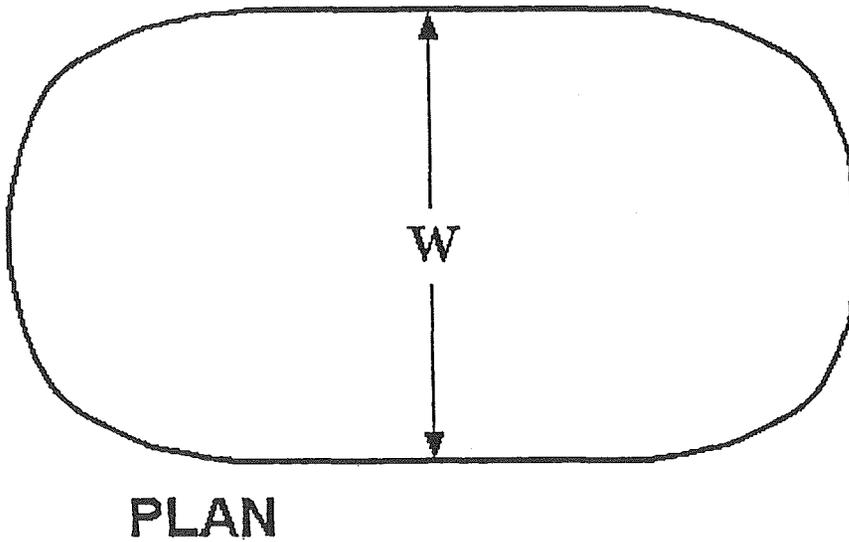
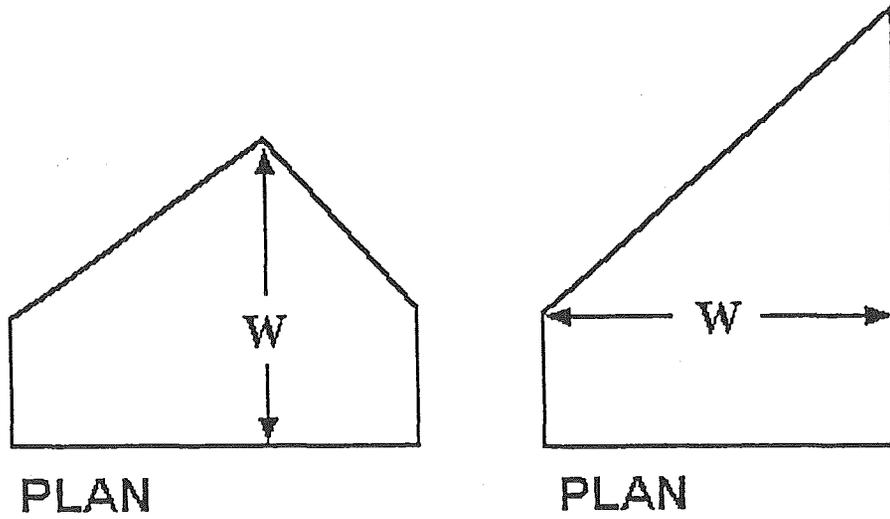


CORRECT



INCORRECT

Example F
Irregular, Non-Rectangular Shaped Roofs



[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-24-051, § 296-155-24523, filed 11/27/96, effective 2/1/97. Statutory Authority: Chapter 49.17 RCW. 95-10-016, § 296-155-24523, filed 4/25/95, effective 10/1/95.]

WAC 296-155-24524 Reserve.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-24-051, § 296-155-24524, filed 11/27/96, effective 2/1/97. Statutory Authority:

Chapter 49.17 RCW. 95-10-016, § 296-155-24524, filed 4/25/95, effective 10/1/95.]

WAC 296-155-24525 Appendix B to Part C-1—Fall restraint and fall arrest (employer information only). Additional standards that require the use of fall restraint and/or fall arrest protection for employees are listed below:

Ladders	WAC 296-155-480 (1)(r) WAC 296-155-480 (1)(s)
Suspended Scaffold	WAC 296-155-485 (7)(h)
Two Points Suspension Scaffold	WAC 296-155-485 (7)(h)(i)
Boatswain's Chain Scaffold	WAC 296-155-485 (10)(d)
Needle Beam Scaffold	WAC 296-155-485 (14)(i)
Ladder Jack Scaffold	WAC 296-155-485 (17)(f)
Window Jack Scaffold	WAC 296-155-485 (18)(c)
Float or Ship Scaffold	WAC 296-155-485 (21)(f)
Pump Jack Scaffold	WAC 296-155-485 (23)(k)
Boom Supported Elevating Work Platforms	WAC 296-155-48529 (19)(b)(vi)
Vehicle Mounted Elevated and Rotating Work Platforms	WAC 296-155-48531 (14)(h)
Crane and Derrick Supported Work Platforms	WAC 296-155-48533 (6)(c) WAC 296-155-48533 (6)(d) WAC 296-155-48533 (7)(i) WAC 296-155-48533 (7)(j) WAC 296-155-48533 (7)(k) WAC 296-155-48533 (10)(h)
Open Sided Floors	WAC 296-155-505 (4)(a) through (f)
Pile Driving	WAC 296-155-620 (1)(i)
Vertical Slip Forms	WAC 296-155-688(9)
Placing and Removal of Forms	WAC 296-155-689(4)
Steel Erection Temporary Floors	WAC 296-155-705 (2)(b)
Tunneling (Skips and Platforms)	WAC 296-155-730 (8)(e)

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-24-051, § 296-155-24525, filed 11/27/96, effective 2/1/97. Statutory Authority: Chapter 49.17 RCW. 95-10-016, § 296-155-24525, filed 4/25/95, effective 10/1/95; 91-03-044 (Order 90-18), § 296-155-24525, filed 1/10/91, effective 2/12/91.]

PART D FIRE PROTECTION AND PREVENTION

WAC 296-155-250 Definitions applicable to this part. (1) "Approved" for the purpose of this part, means equipment that has been listed or approved by a nationally recognized testing laboratory such as Factory Mutual Engineering Corp., or Underwriters' Laboratories, Inc., federal agencies such as United States Mine Safety and Health Administration or United States Coast Guard, which issue approvals for such equipment, or the department of labor and industries.

(2) "Closed container" means a container so sealed by means of a lid or other device that neither liquid nor vapor will escape from it at ordinary temperatures.

(3) "Combustible liquid" means any liquid having a flashpoint at or above 100°F (37.8°C). Combustible liquids shall be divided into two classes as follows:

(a) "Class II liquids" shall include those with flashpoints at or above 100°F (37.8°C) and below 140°F (60°C), except any mixture having components with flashpoints of 200°F (93.3°C) or higher, the volume of which make up 99 percent or more of the total volume of the mixture.

(b) "Class III liquids" shall include those with flashpoints at or above 140°F (60°C). Class III liquids are subdivided into two subclasses:

(i) "Class IIIA liquids" shall include those with flashpoints at or above 140°F (60°C) and below 200°F (93.3°C), except any mixture having components with flashpoints of

200°F (93.3°C), or higher, the total volume of which make up 99 percent or more of the total volume of the mixture.

(ii) "Class IIIB liquids" shall include those with flashpoints at or above 200°F (93.3°C). This section does not cover Class IIIB liquids. Where the term "Class III liquids" is used in this section, it shall mean only Class IIIA liquids.

(c) When a combustible liquid is heated for use to within 30°F (16.7°C) of its flashpoint, it shall be handled in accordance with the requirements for the next lower class of liquids.

(4) "Combustion" means any chemical process that involves oxidation sufficient to produce light or heat.

(5) "Fire brigade" means an organized group of employees that are knowledgeable, trained, and skilled in the safe evacuation of employees during emergency situations and in assisting in fire fighting operations.

(6) "Fire resistance" means so resistant to fire that, for specified time and under conditions of a standard heat intensity, it will not fail structurally and will not permit the side away from the fire to become hotter than a specified temperature. For purposes of this part, fire resistance shall be determined by the Standard Methods of Fire Tests of Building Construction and Materials, NFPA 251-72.

(7) "Flammable" means capable of being easily ignited, burning intensely or having a rapid rate of flame spread.

(8) "Flammable liquid" means any liquid having a flashpoint below 100°F (37.8°C), except any mixture having components with flashpoints of 100°F (37.8°C) or higher, the total of which make up 99 percent or more of the total volume of the mixture. Flammable liquids shall be known as Class I liquids. Class I liquids are divided into three classes as follows:

(a) Class IA shall include liquids having flashpoints below 73°F (22.8°C) and having a boiling point below 100°F (37.8°C).

(b) Class IB shall include liquids having flashpoints below 73°F (22.8°C) and having a boiling point at or above 100°F (37.8°C).

(c) Class IC shall include liquids having flashpoints at or above 73°F (22.8°C) and below 100°F (37.8°C).

(9) "Flashpoint" means the minimum temperature at which a liquid gives off vapor within a test vessel in sufficient concentration to form an ignitable mixture with air near the surface of the liquid, and shall be determined as follows:

(a) For a liquid which has a viscosity of less than 45 SUS at 100°F (37.8°C), does not contain suspended solids, and does not have a tendency to form a surface film while under test, the procedure specified in the Standard Method of Test for Flashpoint by Tag Closed Tester (ASTM D-56-70) shall be used.

(b) For a liquid which has a viscosity of 45 SUS or more at 100°F (37.8°C), or contains suspended solids, or has a tendency to form a surface film while under test, the Standard Method of Test for Flashpoint by Pensky-Martens Closed Tester (ASTM D-93-71) shall be used, except that the methods specified in Note 1 to section 1.1 of ASTM D-93-71 may be used for the respective materials specified in the note.

(10) "Liquified petroleum gases" "LPG" and "LP Gas" mean and include any material which is composed predominantly of any of the following hydrocarbons, or mixtures of

them, such as propane, propylene, butane (normal butane or isobutane), and butylenes.

(11) "Portable tank" means a closed container having a liquid capacity more than 60 U.S. gallons, and not intended for fixed installation.

(12) "Safety can" means an approved closed container, of not more than 5 gallons capacity, having a spring-closing lid and spout cover and so designed that it will safely relieve internal pressure when subjected to fire exposure.

(13) "Salamander" means a portable heating device, solid or liquid fueled, which is not vented to the outdoor atmosphere.

(14) "Vapor pressure" means the pressure, measured in pounds per square inch (absolute), exerted by a volatile liquid as determined by the "Standard Method of Test for Vapor Pressure of Petroleum Products (Reid Method)," (ASTM D-323-68).

[Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-250, filed 1/21/86; Order 74-26, § 296-155-250, filed 5/7/74, effective 6/6/74.]

WAC 296-155-260 Fire protection. (1) General requirements.

(a) The employer shall be responsible for development of a fire protection program to be followed throughout all phases of construction and demolition work, and the employer shall provide for fire fighting equipment as specified in this part. As fire hazards occur, there shall be no delay in providing necessary equipment.

(b) Access to all available fire fighting equipment shall be maintained at all times.

(c) All fire fighting equipment, provided by the employer, shall be conspicuously located.

(d) All fire fighting equipment shall be periodically inspected by a competent person, and maintained in operating condition. Defective equipment shall be immediately replaced.

(e) As warranted by the project, the employer shall provide a trained and equipped fire fighting organization (fire brigade) to assure adequate protection to life.

(2) Water supply.

(a) A temporary or permanent water supply, of sufficient volume, duration, and pressure, required to properly

operate fire fighting equipment shall be made available as soon as combustible materials accumulate.

(b) Where underground water mains are to be provided, they shall be installed, completed, and made available for use as soon as practicable.

(3) Portable fire fighting equipment.

(a) A fire extinguisher, rated not less than 2A, shall be provided for each 3,000 square feet of a combustible building area, or major fraction thereof. Travel distance from any point of the protected area to the nearest fire extinguisher shall not exceed a horizontal distance of 100 feet.

Note: One 55-gallon open drum of water with two fire pails may be substituted for a fire extinguisher having a 2A rating.

(b) A 1/2-inch diameter garden-type hose line, not to exceed 100 feet in length and equipped with a nozzle, may be substituted for a 2A-rated fire extinguisher, provided it is capable of discharging a minimum of 5 gallons per minute with a minimum hose stream range of 30 feet horizontally. The garden-type hose lines shall be mounted on conventional racks or reels. The number and location of hose racks or reels shall be such that at least one hose stream can be applied to all points in the area.

(c) One or more fire extinguishers, rated not less than 2A, shall be provided on each floor. In multistory buildings, where combustibles are present, at least one fire extinguisher shall be located adjacent to a stairway.

(d) Extinguishers and water drums, subject to freezing, shall be protected from freezing.

(e) A fire extinguisher, rated not less than 10B, shall be provided within 50 feet of wherever more than 5 gallons of flammable or combustible liquids or 5 pounds of flammable gas are being used on the jobsite. This requirement does not apply to the integral fuel tanks of motor vehicles.

(f) Carbon tetrachloride and other toxic vaporizing liquid fire extinguishers are prohibited.

(g) Portable fire extinguishers shall be inspected periodically and maintained in accordance with Maintenance and Use of Portable Fire Extinguishers, NFPA No. 10A-1981 and the general safety and health standards, chapter 296-24 WAC, Part G-3.

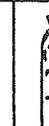
(h) Fire extinguishers which have been listed or approved by a nationally recognized testing laboratory, shall be used to meet the requirements of this part. (See Table D-1)

Table D-1

KNOW YOUR FIRE EXTINGUISHERS

 CLASS A FIRES WOOD, PAPER, TRASH HAVING BLENDING ELEMENTS CLASS B FIRES FLAMMABLE LIQUIDS, GASES, OIL, PAINTS, GREASE, ETC. CLASS C FIRES ELECTRICAL EQUIPMENT CLASS D FIRES COMBUSTIBLE METALS	WATER TYPE				FOAM	CARBON DIOXIDE	DRY CHEMICAL			
	 STORED PRESSURE	 CARTRIDGE OPERATED	 WATER PUMP TANK	 SODA ACID	 FOAM	 CO ₂	 CARTRIDGE OPERATED	 STORED PRESSURE	 STORED PRESSURE	 CARTRIDGE OPERATED
CLASS A FIRES WOOD, PAPER, TRASH HAVING BLENDING ELEMENTS CLASS B FIRES FLAMMABLE LIQUIDS, GASES, OIL, PAINTS, GREASE, ETC. CLASS C FIRES ELECTRICAL EQUIPMENT CLASS D FIRES COMBUSTIBLE METALS	YES	YES	YES	YES	YES	NO	NO	NO	YES	YES
CLASS B FIRES FLAMMABLE LIQUIDS, GASES, OIL, PAINTS, GREASE, ETC. CLASS C FIRES ELECTRICAL EQUIPMENT CLASS D FIRES COMBUSTIBLE METALS	NO	NO	NO	NO	YES	YES	YES	YES	YES	YES
CLASS C FIRES ELECTRICAL EQUIPMENT CLASS D FIRES COMBUSTIBLE METALS	NO	NO	NO	NO	NO	YES	YES	YES	YES	YES
SPECIAL EXTINGUISHING AGENTS APPROVED BY RECOGNIZED TESTING LABORATORIES										
METHOD OF OPERATION	PULL PIN - SQUEEZE HANDLE	TURN UPSIDE DOWN AND SLAP	PUMP HANDLE	TURN UPSIDE DOWN	TURN UPSIDE DOWN	PULL PIN - SQUEEZE LEVER	RUPTURE CARTRIDGE - SQUEEZE LEVER	PULL PIN - SQUEEZE HANDLE	PULL PIN - SQUEEZE HANDLE	RUPTURE CARTRIDGE - SQUEEZE LEVER
RANGE	30' - 40'	30' - 40'	30' - 40'	30' - 40'	30' - 40'	3' - 8'	5' - 20'	5' - 20'	5' - 20'	5' - 20'
MAINTENANCE	CHECK AIR PRESSURE GAUGE MONTHLY	WEIGH GAS CARTRIDGE AND FILL WATER IF REQUIRED ANNUALLY	DISCHARGE AND FILL WITH WATER ANNUALLY	DISCHARGE ANNUALLY RECHARGE	DISCHARGE ANNUALLY RECHARGE	WEIGH SEMI ANNUALLY	WEIGH GAS CARTRIDGE - CHECK CONDITION OF DRY CHEMICAL ANNUALLY	CHECK PRESSURE GAUGE AND CONDITION OF DRY CHEMICAL ANNUALLY	CHECK PRESSURE GAUGE AND CONDITION OF DRY CHEMICAL ANNUALLY	WEIGH GAS CARTRIDGE - CHECK CONDITION OF DRY CHEMICAL ANNUALLY

KNOW YOUR FIRE EXTINGUISHERS

 CLASS A FIRES WOOD, PAPER, TRASH HAVING BLENDING ELEMENTS CLASS B FIRES FLAMMABLE LIQUIDS, GASES, OIL, PAINTS, GREASE, ETC. CLASS C FIRES ELECTRICAL EQUIPMENT CLASS D FIRES COMBUSTIBLE METALS	WATER TYPE				FOAM	CARBON DIOXIDE	DRY CHEMICAL			
	 STORED PRESSURE	 CARTRIDGE OPERATED	 WATER PUMP TANK	 SODA ACID	 FOAM	 CO ₂	 CARTRIDGE OPERATED	 STORED PRESSURE	 STORED PRESSURE	 CARTRIDGE OPERATED
CLASS A FIRES WOOD, PAPER, TRASH HAVING BLENDING ELEMENTS CLASS B FIRES FLAMMABLE LIQUIDS, GASES, OIL, PAINTS, GREASE, ETC. CLASS C FIRES ELECTRICAL EQUIPMENT CLASS D FIRES COMBUSTIBLE METALS	YES	YES	YES	YES	YES	NO	NO	NO	YES	YES
CLASS B FIRES FLAMMABLE LIQUIDS, GASES, OIL, PAINTS, GREASE, ETC. CLASS C FIRES ELECTRICAL EQUIPMENT CLASS D FIRES COMBUSTIBLE METALS	NO	NO	NO	NO	YES	YES	YES	YES	YES	YES
CLASS C FIRES ELECTRICAL EQUIPMENT CLASS D FIRES COMBUSTIBLE METALS	NO	NO	NO	NO	NO	YES	YES	YES	YES	YES
SPECIAL EXTINGUISHING AGENTS APPROVED BY RECOGNIZED TESTING LABORATORIES										
METHOD OF OPERATION	PULL PIN - SQUEEZE LEVER	TURN UPSIDE DOWN AND PUMP	PUMP HANDLE	TURN UPSIDE DOWN	TURN UPSIDE DOWN	PULL PIN - SQUEEZE LEVER	RUPTURE CARTRIDGE - SQUEEZE LEVER	PULL PIN - SQUEEZE HANDLE	PULL PIN - SQUEEZE HANDLE	RUPTURE CARTRIDGE - SQUEEZE LEVER
RANGE	30' - 40'	30' - 40'	30' - 40'	30' - 40'	30' - 40'	3' - 8'	5' - 20'	5' - 20'	5' - 20'	5' - 20'
MAINTENANCE	CHECK AIR PRESSURE GAUGE MONTHLY	WEIGH GAS CARTRIDGE AND FILL WATER IF REQUIRED ANNUALLY	DISCHARGE AND FILL WITH WATER ANNUALLY	DISCHARGE ANNUALLY RECHARGE	DISCHARGE ANNUALLY RECHARGE	WEIGH SEMI ANNUALLY	WEIGH GAS CARTRIDGE - CHECK CONDITION OF DRY CHEMICAL ANNUALLY	CHECK PRESSURE GAUGE AND CONDITION OF DRY CHEMICAL ANNUALLY	CHECK PRESSURE GAUGE AND CONDITION OF DRY CHEMICAL ANNUALLY	WEIGH GAS CARTRIDGE - CHECK CONDITION OF DRY CHEMICAL ANNUALLY

Note: One hundred feet, or less, of 1-1/2 inch hose, with a nozzle capable of discharging water at 25 gallons or more per minute, may be substituted for a fire extinguisher rated not more than 2A in the designated area provided that the hose line can reach all points in the area.

(i) If fire hose connections are not compatible with local fire fighting equipment, the contractor shall provide adapters, or equivalent, to permit connections.

(j) During demolition involving combustible materials, charged hose lines, supplied by hydrants, water tank trucks

with pumps, or equivalent, shall be made available.

(4) Fixed fire fighting equipment.

(a) Sprinkler protection.

(i) If the facility being constructed includes the installation of automatic sprinkler protection, the installation shall closely follow the construction and be placed in service as soon as applicable laws permit following completion of each story.

(ii) During demolition or alterations, existing automatic

sprinkler installations shall be retained in service as long as reasonable. The operation of sprinkler control valves shall be permitted only by properly authorized persons.

Note: Modification of sprinkler systems to permit alterations or additional demolition should be expedited so that the automatic protection may be returned to service as quickly as possible. Sprinkler control valves shall be checked daily at close of work to ascertain that the protection is in service.

(b) Standpipes. In all structures in which standpipes are required, or where standpipes exist in structures being altered, they shall be brought up as soon as applicable laws permit, and shall be maintained as construction progresses in such a manner that they are always ready for fire protection use. The standpipes shall be provided with Siamese fire department connections on the outside of the structure, at the street level, which shall be conspicuously marked. There shall be at least one standard hose outlet at each floor.

(5) Fire alarm devices.

(a) An alarm system, e.g., telephone system, siren, etc., shall be established by the employer whereby employees on the site and the local fire department can be alerted for an emergency.

(b) The alarm code and reporting instructions shall be conspicuously posted at phones and at employee entrances.

(6) Fire cutoffs.

(a) Fire walls and exit stairways, required for the completed buildings, shall be given construction priority. Fire doors, with automatic closing devices, shall be hung on openings as soon as practical.

(b) Fire cutoffs shall be retained in buildings undergoing alterations or demolition until operations necessitate their removal.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-260, filed 7/20/94, effective 9/20/94. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-260, filed 1/21/86; Order 76-6, § 296-155-260, filed 3/1/76; Order 74-26, § 296-155-260, filed 5/7/74, effective 6/6/74.]

Reviser's note: RCW 34.05.395 requires the use of underlining and deletion marks to indicate amendments to existing rules, and deems ineffectual changes not filed by the agency in this manner. The bracketed material in the above section does not appear to conform to the statutory requirement.

WAC 296-155-265 Fire prevention. (1) Ignition hazards.

(a) Electrical wiring and equipment for light, heat, or power purposes shall be installed in compliance with the requirements of Part I of this standard.

(b) Internal combustion engine powered equipment shall be so located that exhausts are well away from combustible materials. When exhausts are piped to outside the building under construction, a clearance of at least 6 inches shall be maintained between such piping and combustible material.

(c) Smoking shall be prohibited at or in the vicinity of operations which constitute a fire hazard, and shall be conspicuously posted: "No smoking or open flame."

(d) Portable battery powered lighting equipment, used in connection with the storage, handling, or use of flammable gases or liquids, shall be of the type approved for the hazardous locations.

(e) The nozzle of air, inert gas, and steam lines or hoses, when used in the cleaning or ventilation of tanks and vessels that contain hazardous concentrations of flammable

gases or vapors, shall be bonded to the tank or vessel shell. Bonding devices shall not be attached or detached in hazardous concentrations of flammable gases or vapors.

(f) Workers shall not take open lights or open flames near or in an open sewer manhole, gas main, conduit or other similar place until the absence of explosive or harmful gases has been assured. Open lights or flames shall not be carried into areas and enclosures where flammable vapors or exposed low flash point solvents exist. Only approved and suitable protected lights shall be used.

(2) Temporary buildings.

(a) No temporary building shall be erected where it will adversely affect any means of exit.

(b) Temporary buildings, when located within another building or structure, shall be of either noncombustible construction or of combustible construction having a fire resistance of not less than 1 hour.

(c) Temporary buildings, located other than inside another building and not used for the storage, handling, or use of flammable or combustible liquids, flammable gases, explosives, or blasting agents, or similar hazardous occupancies, shall be located at a distance of not less than 10 feet from another building or structure. Groups of temporary buildings, not exceeding 2,000 square feet in aggregate, shall, for the purpose of this part, be considered a single temporary building.

(3) Open yard storage.

(a) Combustible materials shall be piled with due regard to the stability of piles and in no case higher than 20 feet.

(b) Driveways between and around combustible storage piles shall be at least 15 feet wide and maintained free from accumulation of rubbish, equipment, or other articles or materials. Driveways shall be so spaced that a maximum grid system unit of 50 feet by 150 feet is produced.

(c) The entire storage site shall be kept free from accumulation of unnecessary combustible materials. Weeds and grass shall be kept down and a regular procedure provided for the periodic cleanup of the entire area.

(d) When there is a danger of an underground fire, that land shall not be used for combustible or flammable storage.

(e) Method of piling shall be solid wherever possible and in orderly and regular piles. No combustible material shall be stored outdoors within 10 feet of a building or structure.

(f) Portable fire extinguishing equipment, suitable for the fire hazard involved, shall be provided at convenient, conspicuously accessible locations in the yard area. Portable fire extinguishers, rated not less than 2A, shall be placed so that maximum travel distance to the nearest unit shall not exceed 100 feet.

(4) Indoor storage.

(a) Storage shall not obstruct, or adversely affect, means of exit.

(b) All materials shall be stored, handled, and piled with due regard to their fire characteristics.

(c) Noncompatible materials, which may create a fire hazard, shall be segregated by a barrier having a fire resistance of at least 1 hour.

(d) Material shall be piled to minimize the spread of fire internally and to permit convenient access for firefighting. Stable piling shall be maintained at all times. Aisle space shall be maintained to safely accommodate the widest

vehicle that may be used within the building for fire-fighting purposes.

(e) Clearance of at least 36 inches shall be maintained between the top level of the stored material and the sprinkler deflectors.

(f) Clearance shall be maintained around lights and heating units to prevent ignition of combustible materials.

(g) A clearance of 24 inches shall be maintained around the path of travel of fire doors unless a barricade is provided, in which case no clearance is needed. Material shall not be stored within 36 inches of a fire door opening.

[Statutory Authority: Chapter 49.17 RCW. 88-23-054 (Order 88-25), § 296-155-265, filed 11/14/88; Order 74-26, § 296-155-265, filed 5/7/74, effective 6/6/74.]

WAC 296-155-270 Flammable and combustible liquids. (1) General requirements.

(a) Only approved containers and portable tanks shall be used for storage and handling of flammable and combustible liquids. Approved metal safety cans shall be used for the handling and use of flammable liquids in quantities greater than one gallon, except that this shall not apply to those flammable liquid materials which are highly viscid highly (extremely hard to pour), which may be used and handled in original shipping containers. For quantities of one gallon or less, only the original container or approved metal safety cans shall be used for storage, use, and handling of flammable liquids.

(b) Flammable or combustible liquids shall not be stored in areas used for exits, stairways, or normally used for the safe passage of people.

(c) Flammable and combustible liquid containers shall be legibly marked to indicate their contents. Each storage container for flammable or combustible liquids, with a capacity of 50 gallons or more, shall have the contents of the container identified by a sign of clearly visible contrasting colors with letters at least 3 inches high, painted on the container at the discharge valve and at the fill point.

(d) Gasoline shall not be used as a solvent or a cleaning agent.

(2) Indoor storage of flammable and combustible liquids.

(a) No more than 25 gallons of flammable or combustible liquids shall be stored in a room outside of an approved storage cabinet. For storage of liquid petroleum gas, see WAC 296-155-275.

(b) Quantities of flammable and combustible liquid in excess of 25 gallons shall be stored in an acceptable or approved cabinet meeting the following requirements:

(i) Acceptable wooden storage cabinets shall be constructed in the following manner, or equivalent: The bottom, sides, and top shall be constructed of an exterior grade of plywood at least 1 inch in thickness, which shall not break down or delaminate under standard fire test conditions. All joints shall be rabbeted and shall be fastened in two directions with flathead wood screws, when more than one door is used, there shall be a rabbeted overlap of not less than 1 inch. Steel hinges shall be mounted in such a manner as to not lose their holding capacity due to loosening or burning out of the screws when subjected to fire. Such cabinets shall be painted inside and out with fire retardant paint.

(ii) Approved metal storage cabinets will be acceptable.
(iii) Cabinets shall be labeled in conspicuous lettering, "Flammable—Keep fire away."

(c) Not more than 60 gallons of flammable or 120 gallons of combustible liquids shall be stored in any one storage cabinet. Not more than three such cabinets may be located in a single storage area. Quantities in excess of this shall be stored in an inside storage room.

(d)(i) Inside storage room shall be constructed to meet the required fire-resistive rating for their use. Such construction shall comply with the test specifications set forth in Standard Methods of Fire Test of Building Construction and Material, NFPA 251-1972.

(ii) Where an automatic extinguishing system is provided, the system shall be designed and installed in an approved manner. Openings to other rooms or buildings shall be provided with noncombustible liquid-tight raised sills or ramps at least 4 inches in height, or the floor in the storage area shall be at least 4 inches below the surrounding floor. Openings shall be provided with approved self-closing fire doors. The room shall be liquid-tight where the walls join the floor. A permissible alternate to the sill or ramp is an open-grated trench, inside of the room, which drains to a safe location. Where other portions of the building or other buildings are exposed, windows shall be protected as set forth in the Standard for Fire Doors and Windows, NFPA No. 80-1983, for Class E or F openings. Wood of at least 1-inch nominal thickness may be used for shelving, racks, dunnage, scuffboards, floor overlay and similar installations.

(iii) Materials which will react with water and create a fire hazard shall not be stored in the same room with flammable or combustible liquids.

(iv) Storage in inside storage rooms shall comply with Table D-2 following:

TABLE D-2

Fire protection provided	Fire resistance	Maximum size	Total allowable quantities gals./sq. ft./floor area
Yes	2 hrs.	500 sq. ft.	10
No	2 hrs.	500 sq. ft.	4
Yes	1 hr.	150 sq. ft.	5
No	1 hr.	150 sq. ft.	2

Note: Fire protection system shall be sprinkler, water spray, carbon dioxide or other system approved by a nationally recognized testing laboratory for this purpose.

(v) Electrical wiring and equipment located in inside storage rooms shall be approved for Class 1, Division 1, hazardous locations. For definition of Class 1, Division 1, hazardous locations, see WAC 296-155-456.

(vi) Every inside storage room shall be provided with either a gravity or a mechanical exhausting system. Such system shall commence not more than 12 inches above the floor and be designed to provide for a complete change of air within the room at least 6 times per hour. If a mechani-

cal exhausting system is used, it shall be controlled by a switch located outside of the door. The ventilating equipment and any lighting fixtures shall be operated by the same switch. An electric pilot light shall be installed adjacent to the switch if flammable liquids are dispensed within the room. Where gravity ventilation is provided, the fresh air intake, as well as the exhausting outlet from the room, shall be on the exterior of the building in which the room is located.

(vii) In every inside storage room there shall be maintained one clear aisle at least 3 feet wide. Containers over 30 gallons capacity shall not be stacked one upon the other.

(viii) Flammable and combustible liquids in excess of that permitted in inside storage rooms shall be stored outside of buildings in accordance with subsection (3) of this section.

(3) Storage outside buildings.

(a) Storage of containers (not more than 60 gallons each) shall not exceed 1,100 gallons in any one pile or area. Piles or groups of containers shall be separated by a 5-foot clearance. Piles or groups of containers shall not be nearer than 20 feet to a building.

(b) Within 200 feet of each pile of containers, there shall be a 12-foot-wide access way to permit approach of fire control apparatus.

(c) The storage area shall be graded in a manner to divert possible spills away from buildings or other exposures, or shall be surrounded by a curb or earth dike at least 12 inches high. When curbs or dikes are used, provisions shall be made for draining off accumulations of ground or rain water, or spills of flammable or combustible liquids. Drains shall terminate at a safe location and shall be accessible to operation under fire conditions.

(d) Outdoor portable tank storage.

(i) Portable tanks shall not be nearer than 20 feet from any building. Two or more portable tanks, grouped together, having a combined capacity in excess of 2,200 gallons, shall be separated by a 5-foot-clear area. Individual portable tanks exceeding 1,100 gallons shall be separated by a 5-foot-clear area.

(ii) Within 200 feet of each portable tank, there shall be a 12-foot-wide access way to permit approach of fire control apparatus.

(e) Storage areas shall be kept free of weeds, debris, and other combustible material not necessary to the storage.

(f) Portable tanks, not exceeding 660 gallons, shall be provided with emergency venting and other devices, as required by chapters III and IV of NFPA 30-1972, The Flammable and Combustible Liquids Code.

(g) Portable tanks, in excess of 660 gallons, shall have emergency venting and other devices, as required by chapters II and III of the Flammable and Combustible Liquids Code, NFPA 30-1972.

(4) Fire control for flammable or combustible liquid storage.

(a) At least one portable fire extinguisher, having a rating of not less than 20-B units, shall be located outside of, but not more than 10 feet from, the door opening into any room used for storage of more than 60 gallons of flammable or combustible liquids.

(b) At least one portable fire extinguisher having a rating of not less than 20-B units shall be located not less

than 25 feet, nor more than 75 feet, from any flammable liquid storage area located outside.

(c) When sprinklers are provided, they shall be installed in accordance with the Standard for the Installation of Sprinkler Systems, NFPA 13-1972.

(d) At least one portable fire extinguisher having a rating of not less than 20-B:C units shall be provided on all tank trucks or other vehicles used for transporting and/or dispensing flammable or combustible liquids.

(5) Dispensing liquids.

(a) Areas in which flammable or combustible liquids are transferred at the same time, in quantities greater than 5 gallons from one tank or container to another tank or container, shall be separated from other operations by 25-foot distance or by construction having a fire-resistance of at least 1 hour. Drainage or other means shall be provided to control spills. Adequate natural or mechanical ventilation shall be provided to maintain the concentration of flammable vapor at or below 10 percent of the lower flammable limit.

(b) Transfer flammable liquids from one container to another shall be done only when containers are electrically interconnected (bonded).

(c) Flammable or combustible liquids shall be drawn from or transferred into vessels, containers, or tanks within a building or outside only through a closed piping system, from safety cans, by means of a device drawing through the top, or from a container, or portable tanks, by gravity or pump, through an approved self-closing valve. Transferring by means of air pressure on the container or portable tank is prohibited.

(d) The dispensing units shall be protected against collision damage.

(e) Dispensing devices and nozzles for flammable liquids shall be of an approved type, as required by WAC 296-24-33015.

(6) Handling liquids at point of final use.

(a) Flammable liquids shall be kept in closed containers when not actually in use.

(b) Leakage or spillage of flammable or combustible liquids shall be disposed of promptly and safely.

(c) Flammable liquids shall be used only where there are no open flames or other sources of ignition within 50 feet of the operation, unless conditions warrant greater clearance.

(7) Service and refueling areas.

(a) Flammable or combustible liquids shall be stored in approved closed containers, in tanks located underground, or in aboveground portable tanks.

(b) The tank trucks shall comply with the requirements covered in the Standard for Tank Vehicles for Flammable and Combustible Liquids, NFPA No. 385-1977.

(c) The dispensing hose shall be an approved type.

(d) The dispensing nozzle shall be an approved automatic-closing type.

(e) Underground tanks shall not be abandoned.

(f) Clearly identified and easily accessible switch(es) shall be provided at a location remote from dispensing devices to shut off the power to all dispensing devices in the event of an emergency.

(g)(i) Heating equipment of an approved type may be installed in the lubrication or service area where there is no dispensing or transferring of flammable liquids, provided the

bottom of the heating unit is at least 18 inches above the floor and is protected from physical damage.

(ii) Heating equipment installed in lubrication or service areas, where flammable liquids are dispensed, shall be of an approved type for garages, and shall be installed at least 8 feet above the floor.

(h) There shall be no smoking or open flames in the areas used for fueling, servicing fuel systems for internal combustion engines, receiving or dispensing of flammable or combustible liquids.

(i) Conspicuous and legible signs prohibiting smoking shall be posted.

(j) The motor of any equipment being fueled shall be shut off during the fueling operation.

(k) Each service or fueling area shall be provided with at least one fire extinguisher having a rating of not less than 20BC located so that an extinguisher will be within 75 feet of each pump, dispenser, underground fill pipe opening, and lubrication or service area.

[Statutory Authority: Chapter 49.17 RCW. 88-23-054 (Order 88-25), § 296-155-270, filed 11/14/88. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-270, filed 1/21/86; Order 74-26, § 296-155-270, filed 5/7/74, effective 6/6/74.]

WAC 296-155-275 Liquefied petroleum gas (LP-gas). (1) Approval of equipment and systems.

(a) Each system shall have containers, valves, connectors, manifold valve assemblies, and regulators of an approved type.

(b) All cylinders shall meet the department of transportation specification identification requirements published in 49 CFR Part 178, Shipping Container Specifications.

(2) Welding on LP-gas containers. Welding is prohibited on containers.

(3) Container valves and container accessories.

(a) Valves, fittings, and accessories connected directly to the container, including primary shut off valves, shall have a rated working pressure of at least 250 p.s.i.g. and shall be of material and design suitable for LP-gas service.

(b) Connections to containers, except safety relief connections, liquid level gauging devices, and plugged openings, shall have shutoff valves located as close to the container as practicable.

(4) Safety devices.

(a) Every container and every vaporizer shall be provided with one or more approved safety relief valves or devices. These valves shall be arranged to afford free vent to the outer air with discharge not less than 5 feet horizontally away from any opening into a building which is below such discharge.

(b) Shutoff valves shall not be installed between the safety relief device and the container, or the equipment or piping to which the safety relief device is connected, except that a shutoff valve may be used where the arrangement of this valve is such that full required capacity flow through the safety relief device is always afforded.

(c) Container safety relief devices and regulator relief vents shall be located not less than 5 feet in any direction from air openings into sealed combustion system appliances or mechanical ventilation air intakes.

(5) Dispensing.

(a) Filling of fuel containers for trucks or motor vehicles from bulk storage containers shall be performed not less than 10 feet from the nearest masonry-walled building, or not less than 25 feet from the nearest building or other construction and, in any event, not less than 25 feet from any building opening.

(b) Filling of portable containers or containers mounted on skids from storage containers shall be performed not less than 50 feet from the nearest building.

(6) Requirements for appliances.

(a) LP-gas consuming appliances shall be approved types.

(b) Any appliance that was originally manufactured for operation with a gaseous fuel other than LP-gas, and is in good condition, may be used with LP-gas only after it is properly converted, adapted, and tested for performance with LP-gas before the appliance is placed in use.

(7) Containers and regulating equipment installed outside of buildings or structures. Containers shall be upright upon firm foundations or otherwise firmly secured. The possible effect on the outlet piping of settling shall be guarded against by a flexible connection or special fitting.

(8) Containers and equipment used inside of buildings or structures.

(a) When operational requirements make portable use of containers necessary, and their location outside of buildings or structures is impractical, containers and equipment are permitted to be used inside of buildings or structures in accordance with (b) through (k) of this subsection. In addition, there may be provisions of this section that are applicable to the particular use or occupancy.

(b) "Containers in use" means connected for use.

(c) Systems utilizing containers having a water capacity greater than 2 1/2-pounds (nominal 1 pound LP-gas capacity) shall be equipped with excess flow valves. Such excess flow valves shall be either integral with the container valves or in the connections to the container valve outlets.

(d) Regulators, when required, shall be either directly connected to the container valves or to manifolds connected to the container valves. The regulator shall be suitable for use with LP-gas. Manifolds and fittings connecting containers to pressure regulator inlets shall be designed for at least 250 p.s.i.g. service pressure.

(e) Valves on containers having water capacity greater than 50 pounds (nominal 20 pounds LP-gas capacity) shall be protected from damage while in use or storage.

(f) Aluminum piping or tubing shall not be used.

(g) Hose shall be designed for a working pressure of at least 250 p.s.i.g. Design, construction, and performance of hose, and hose connections shall have their suitability determined by listing by a nationally recognized testing agency. The hose length shall be as short as practical. Hoses shall be long enough to permit compliance with spacing provisions of (a) through (m) of this subsection, without kinking or straining, or causing hose to be so close to a burner as to be damaged by heat.

(h) Portable heaters, including salamanders, shall be equipped with an approved automatic device to shut off the flow of gas to the mainburner, and pilot if used, in the event of flame failure. Such heaters, having inputs above 50,000 BTU per hour, shall be equipped with either a pilot, which

must be lighted and proved before the main burner can be turned on, or an electrical ignition system.

Note: The provisions of this subdivision do not apply to portable heaters under 7,500 BTU per hour input when used with containers having a maximum water capacity of 2 1/2 pounds.

(i) Container valves, connectors, regulators, manifolds, piping, and tubing shall not be used as structural supports for heaters.

(j) Containers, regulating equipment, manifolds, pipe, tubing, and hose shall be located to minimize exposure to high temperatures or physical damage.

(k) Containers having a water capacity greater than 2 1/2 pounds (nominal 1 pound LP-gas capacity) connected for use shall stand on a firm and substantially level surface and, when necessary, shall be secured in an upright position.

(l) The maximum water capacity of individual containers shall be 245 pounds (nominal 100 pounds LP-gas capacity).

(m) For temporary heating, heaters (other than integral heater-container units) shall be located at least 6 feet from any LP-gas container. This shall not prohibit the use of heaters specifically designed for attachment to the container or to a supporting standard, provided they are designed and installed so as to prevent direct or radiant heat application from the heater onto the containers. Blower and radiant type heaters shall not be directed toward any LP-gas container within 20 feet.

(n) If two or more heater-container units, of either the integral or nonintegral type, are located in an unpartitioned area on the same floor, the container or containers of each unit shall be separated from the container or containers of any other unit by at least 20 feet.

(o) When heaters are connected to containers for use in an unpartitioned area on the same floor, the total water capacity of containers, manifolded together for connection to a heater or heaters, shall not be greater than 735 pounds (nominal 300 pounds LP-gas capacity). Such manifolds shall be separated by at least 20 feet.

(p) Storage of containers awaiting use shall be in accordance with subsections (10) and (11) of this section.

(9) Multiple container systems.

(a) Valves in the assembly of multiple container systems shall be arranged so that replacement of containers can be made without shutting off the flow of gas in the system. This provision is not to be construed as requiring an automatic changeover device.

(b) Heaters shall be equipped with an approved regulator in the supply line between the fuel cylinder and the heater unit. Cylinder connectors shall be provided with an excess flow valve to minimize the flow of gas in the event the fuel line becomes ruptured.

(c) Regulators and low-pressure relief devices shall be rigidly attached to the cylinder valves, cylinders, supporting standards, the building walls, or otherwise rigidly secured, and shall be so installed or protected from the elements.

(10) Storage of LPG containers. Storage of LPG within building is prohibited.

(11) Storage outside of buildings.

(a) Storage outside of buildings, for containers awaiting use, shall be located from the nearest building or group of buildings, in accordance with Table D-3:

TABLE D-3

Quantity of LP-gas stored:	Distance (feet)
500 lbs. or less	0
501 to 6,000 lbs.	10
6,001 to 10,000 lbs.	20
Over 10,000 lbs.	25

(b) Containers shall be in a suitable ventilated enclosure or otherwise protected against tampering, or possible damage by vehicular traffic.

(12) Fire protection. Storage locations shall be provided with at least one approved portable fire extinguisher having a rating of not less than 20-B:C.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-275, filed 1/21/86; Order 76-29, § 296-155-275, filed 9/30/76; Order 74-26, § 296-155-275, filed 5/7/74, effective 6/6/74.]

WAC 296-155-280 Temporary heating devices. (1) Ventilation.

(a) Fresh air shall be supplied in sufficient quantities to maintain the health and safety of workers. Where natural means of fresh air supply is inadequate, mechanical ventilation shall be provided.

(b) When heaters are used in confined spaces, special care shall be taken to provide sufficient ventilation in order to ensure proper combustion, maintain the health and safety of workers, and limit temperature rise in the area.

(2) Clearance and mounting.

(a) Temporary heating devices shall be installed to provide clearance to combustible material not less than the amount shown in Table D-4.

(b) Temporary heating devices, which are listed for installation with lesser clearances than specified in Table D-4, may be installed in accordance with their approval.

TABLE D-4

Heating appliances	Minimum clearance, (inches)		
	Sides	Rear	Chimney connector
Room heater, circulating type	12	12	18
Room heater, radiant type	36	36	18

(c) Heaters not suitable for use on wood floors shall not be set directly upon them or other combustible materials. When such heaters are used, they shall rest on suitable heat insulating material or at least 1-inch concrete, or equivalent. The insulating material shall extend beyond the heater 2 feet or more in all directions.

(d) Heaters used in the vicinity of combustible tarpaulins, canvas, or similar coverings shall be located at least 10 feet from the coverings. The coverings shall be securely fastened to prevent ignition or upsetting of the heater due to wind action on the covering or other material.

(3) Stability. Heaters, when in use, shall be set horizontally level, unless otherwise permitted by the manufacturer's markings.

(4) Oil-fired heaters.

(a) Flammable liquid-fired heaters shall be equipped with a primary safety control to stop the flow of fuel in the event of flame failure. Barometric or gravity oil feed shall not be considered a primary safety control.

(b) Heaters designed for barometric or gravity oil feed shall be used only with the integral tanks.

(c) Heaters specifically designed and approved for use with separate supply tanks may be directly connected for gravity feed, or an automatic pump, from a supply tank.

(5) Salamanders.

(a) Coverage. The use of solid fuel salamanders is prohibited in buildings and on scaffolds.

(b) General requirements.

(i) All solid fuel salamanders shall be designed and constructed for use with solid fuel, that is, coal or coke.

(ii) Solid fuel salamanders shall be equipped with a cover designed as part of the unit, to prevent spillage of burning material in case of tipover.

(iii) Salamanders shall be assembled in accordance with the instructions issued by the manufacturer.

(iv) The safeguards engineered into the product shall be maintained and any replacement shall be equivalent thereto.

(v) Salamanders shall be stored in such a manner as to prevent deterioration or damage to the unit.

(c) Operation.

(i) Manufacturers' instructions shall be followed by the user.

(ii) Each time a salamander is placed in operation it shall be checked to insure that it is functioning properly. Its operation shall be checked periodically thereafter.

(iii) When concentrations of carbon monoxide attain quantities greater than 35 parts per million (0.0035 percent) to air volume at employee breathing levels, the salamander shall be extinguished unless additional natural or mechanical ventilation is provided to reduce the carbon monoxide content to permissible limits.

(iv) Tests for presence of carbon monoxide shall be made by a qualified person within 1 hour after the start of each shift and at least every 3 hours thereafter. If concentrations of carbon monoxide reach 20 parts per million to air volume, tests shall be made more frequently to determine if there is a continuing increase of carbon monoxide concentration.

(v) Records of all tests including the date, time, results obtained, and person making tests, shall be maintained for the duration of the project.

(vi) No persons shall be permitted to be within the area being heated by the salamanders except under the following circumstances: When tending the salamanders; when testing the atmosphere; or in emergency situations.

(vii) No employee shall be permitted to enter the heated area until notification is given to another person located outside. Periodic checks shall be made to ensure the health and safety of employees entering the heated area.

(viii) When a salamander is being used, the responsibility for its operation and maintenance shall be assigned to a qualified employee.

(ix) Salamanders shall not be moved, handled, or serviced while hot or burning, or while component parts are hot to the touch.

(x) Salamanders, when in use, shall be set level with the horizontal unless otherwise permitted by the manufacturer's markings. Salamanders shall be designed so as not to tip over when placed on a surface inclined 25° to the horizontal.

(xi) If equivalent protection and safety is afforded by alternative design, the 25° limitation may be reduced.

(xii) Salamanders not suitable for use on wood floors shall not be set directly upon them or other combustible materials. When such salamanders are used they shall rest on suitable insulating material or at least 1-inch concrete or equivalent. The insulating material shall extend beyond the salamander 2 feet or more in all directions.

(xiii) Salamanders used in the vicinity of tarpaulins, canvas, or similar coverings shall be located a safe distance from coverings and other combustible materials. The coverings shall be securely fastened to prevent ignition of the covering or upsetting of the salamanders due to wind action on the covering or other material.

(xiv) Salamanders in use shall be protected to prevent flame extinguishment.

(d) Ventilation.

(i) Fresh air shall be supplied in sufficient quantities to maintain the health and safety of employees. Where natural means for fresh air supply is inadequate, mechanical ventilation shall be provided. Particular attention shall be given to confined spaces and pockets where heat and fumes may accumulate and employees may be present (roof areas, peaks, basement).

(ii) When salamanders are used in confined spaces, special care shall be taken to provide sufficient ventilation in order to assure proper combustion, maintain the health and safety of employees, and limit temperature rise in the area.

(e) Fueling.

(i) Salamanders shall be refueled only by a person trained in such operations.

(ii) Only a 1 day's supply of heater fuel shall be stored inside a building in the vicinity of the salamander. General fuel storage shall be outside the structure.

(iii) All fuel storage shall be maintained a minimum of 25 feet from source of ignition.

(f) Maintenance.

(i) The user shall comply with the maintenance instructions as provided by the manufacturer.

(ii) Equipment showing evidence of deterioration or damage that constitutes a safety or health hazard shall be removed from service.

(iii) Salamander repairs shall be performed in accordance with the manufacturer's recommendations, and replacement parts shall be equal to, the equivalent of, or the same as the original salamander equipment.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-280, filed 7/20/94, effective 9/20/94; Order 76-29, § 296-155-280, filed 9/30/76; Order 74-26, § 296-155-280, filed 5/7/74, effective 6/6/74.]

**PART E
SIGNS, SIGNALS, AND BARRICADES**

WAC 296-155-300 Accident prevention signs and tags. (1) General. Signs and symbols required by this section shall be visible at all times when work is being performed, and shall be removed or covered promptly when the hazards no longer exist.

(2) Danger signs.

(a) Danger signs (see Figure E-1) shall be used only where an immediate hazard exists.

(b) Danger signs shall have red as the predominating color for the upper panel; black outline on the borders; and a white lower panel for additional sign wording.

(3) Caution signs.

(a) Caution signs (see Figure E-2) shall be used only to warn against potential hazards or to caution against unsafe practices.

(b) Caution signs shall have yellow as the predominating color; black upper panel and borders; yellow lettering of "caution" on the black panel; and the lower yellow panel for additional sign wording. Black lettering shall be used for additional wording.



FIGURE E-1

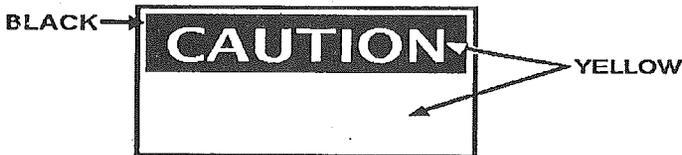


FIGURE E-2

(4) Exit signs.

(a) Every exit sign shall have the word "exit" in plainly legible letters not less than 6 inches high, with the principal strokes of letters not less than three-fourths-inch wide.

(b) Every exit sign shall be distinctive in color and shall provide contrast with decorations, interior finish, or other signs.

(5) Safety instruction signs. Safety instruction signs, when used, shall be white with green upper panel with white letters to convey the principal message. Any additional wording on the sign shall be black letters on the white background.

(6) Directional signs. Directional signs, other than automotive traffic signs specified in subsection (7) of this section, shall be white with a black panel and a white directional symbol. Any additional wording on the sign shall be black letters on the white background.

(7) Traffic signs.

(a) Construction areas shall be posted with legible traffic signs at points of hazard.

(b) All traffic control signs or devices used for protection of construction workers shall conform to and be set up according to American National Standards Institute D6.1-1988, Manual on Uniform Traffic Control Devices for Streets and Highways as amended by the Washington state department of transportation (M24-OT (HT)).

(8) Accident prevention tags.

(a) Accident prevention tags shall be used as a temporary means of warning employees of an existing hazard, such as defective tools, equipment, etc. They shall not be used in place of, or as a substitute for, accident prevention signs.

(b) Specifications for accident prevention tags similar to those in Table E-1 shall apply.

(i) Additional rules. American National Standards Institute (ANSI) Z35.1-1972, Specifications for Accident Prevention signs, and Z35.2-1968, Specifications for Accident Prevention Tags, contain rules which are additional to the rules prescribed in this section. The employer shall comply with ANSI Z35.1-1972 and Z35.2-1968 with respect to rules not specifically prescribed in this part.

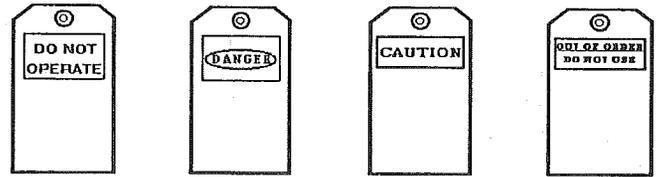


TABLE E-1

Basic Stock (Background)	Safety Colors (Ink)	Copy Specification (Letters)
White tag- White letters on red square	White tag- White letters on red oval with a black square	Yellow tag- Yellow letters on a black background
White	Red	Do Not Operate
White	Black and Red	Danger
Yellow	Black	Caution
White	Black	Out of Order- Do Not Use

[Statutory Authority: Chapter 49.17 RCW. 93-19-142 (Order 93-04), § 296-155-300, filed 9/22/93, effective 11/1/93; 93-01-067 (Order 92-15), § 296-155-300, filed 12/11/92, effective 1/15/93. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-300, filed 1/21/86; Order 74-26, § 296-155-300, filed 5/7/74, effective 6/6/74.]

WAC 296-155-305 Signaling. Flaggers.

(1) When operations are such that signs, signals, and barricades do not provide the necessary protection on or adjacent to a highway or street, flaggers or other appropriate traffic controls shall be provided.

(2) Signaling directions by flaggers shall conform to American National Standards Institute D6.1-1988, Manual on Uniform Traffic Control Devices for Streets and Highways,

as amended by the Washington state department of transportation. (M24-01 (HT)).

(3) Hand signaling by flaggers shall be by use of sign paddles at least 18 inches in diameter with series "C" letters at least 6 inches high or lights approved by the transportation commission. When hand signaling is done in periods of darkness, the sign paddles must be reflectorized or illuminated as required by ANSI D6.1-1988, Manual on Uniform Traffic Control Devices. The "STOP" side of the paddle shall have a red background with white lettering. When a paddle has a "SLOW" side, the background shall be orange and the lettering black. Colors shall conform to ANSI D6.1 current edition.

(4) Flaggers shall wear an orange warning garment and a yellow protective helmet while flagging. Warning garments worn at night shall be of reflectorized material. Yellow is specified as the color of helmets; the issue is clearly one of high visibility. Other colors providing equal visibility than the specified yellow will be acceptable. The iridescent or reflectorized hard hats, available in several colors, which provide "high visibility" in both day and night applications, will meet standard specifications.

(5) Each flagger shall be trained every three years in accordance with the American National Standards Institute (ANSI) D6.1-1988 Manual on Uniform Traffic Control Devices as amended by the Washington state department of transportation (M 24-01 (HT)).

Note: Personnel that have not completed a flagging course may be assigned duties as flaggers only during emergencies when a sudden, generally unexpected, set of circumstances demands immediate attention.

(6) Each flagger shall have in their possession a valid certificate which verifies completion of the training prescribed in subsection (5) of this section. Each certificate shall contain the date the card expires.

[Statutory Authority: Chapter 49.17 RCW. 93-19-142 (Order 93-04), § 296-155-305, filed 9/22/93, effective 11/1/93; 93-01-067 (Order 92-15), § 296-155-305, filed 12/11/92, effective 1/15/93; 89-11-035 (Order 89-03), § 296-155-305, filed 5/15/89, effective 6/30/89. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-305, filed 1/21/86; Order 76-6, § 296-155-305, filed 3/1/76; Order 74-26, § 296-155-305, filed 5/7/74, effective 6/6/74.]

WAC 296-155-310 Barricades. Barricades for protection of employees shall conform to the portions of the American National Standards Institute D6.1-1988, Manual on Uniform Traffic Control Devices for Streets and Highways, as amended by the Washington state department of high-ways, (M24-01 (HT)), relating to barricades.

[Statutory Authority: Chapter 49.17 RCW. 93-19-142 (Order 93-04), § 296-155-310, filed 9/22/93, effective 11/1/93; Order 74-26, § 296-155-310, filed 5/7/74, effective 6/6/74.]

WAC 296-155-315 Definitions applicable to this part. (1) "Barricade" means an obstruction to deter the passage of persons or vehicles.

(2) "Signs" are the warnings of hazard, temporarily or permanently affixed or placed, at locations where hazards exist.

(3) "Signals" are moving signs, provided by workers, such as flagger, or by devices, such as flashing lights, to warn of possible or existing hazards.

(4) "Tags" are temporary signs, usually attached to a piece of equipment or part of a structure, to warn of existing or immediate hazards.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-315, filed 7/20/94, effective 9/20/94; Order 76-6, § 296-155-315, filed 3/1/76.]

PART F MATERIAL HANDLING, STORAGE, USE AND DISPOSAL

WAC 296-155-325 General requirements for storage. (1) General.

(a) All materials stored in tiers shall be stacked, racked, blocked, interlocked, or otherwise secured to prevent sliding, falling or collapse.

(b) Maximum safe load limits of floors within buildings and structures, in pounds per square foot, shall be conspicuously posted in all storage areas, except for floor or slab on grade. Maximum safe loads shall not be exceeded.

(c) Aisles and passageways shall be kept clear to provide for the free and safe movement of material handling equipment or employees. Such areas shall be kept in good repair.

(d) When a difference in road or working levels exist, means such as ramps, blocking, or grading shall be used to ensure the safe movement of vehicles between the two levels.

(2) Material storage.

(a)(i) Material stored inside buildings under construction shall not be placed within 6 feet of any hoistway or inside floor openings, nor within 10 feet of an exterior wall which does not extend above the top of the material stored.

(ii) Temporary floors, used in steel erection, concrete forms and shoring (i.e., stripped forms, shoring jacks, clamps, steel rods or pipes, base plates, etc.) placed within close proximity to an open-sided floor for movement to another tier for placement, shall be considered "in-process equipment and subject to the provisions contained in Parts "O" and "P" of this standard. When this type equipment is to be left overnight or for longer periods of time it shall be anchored and braced to prevent displacement in any direction. In addition this equipment shall be subject to the provisions of this subsection while in "interim storage."

(b) Each employee required to work on stored material in silos, hoppers, tanks, and similar storage areas shall be equipped with personal fall arrest equipment meeting the requirements of chapter 296-155 WAC, Part C-1.

(c) Noncompatible materials shall be segregated in storage.

(d) Bagged materials shall be stacked by stepping back the layers and cross-keying the bags at least every 10 bags high.

(i) When cement and lime is delivered in paper bags they shall be carefully handled to prevent the bags bursting.

(ii) Cement and lime bags shall not be piled more than ten bags high except when stored in bins or enclosures built for the purpose of storage.

(iii) When bags are removed from the pile, the length of the pile shall be kept at an even height, and the necessary step backs every five bags maintained.

(iv) Persons handling cement and lime bags shall wear eye protection which prevents contact between the substance and the worker's eyes (such as goggles or other sealed eye protection) and shall wear long sleeve shirts with close fitting collar and cuffs.

(v) Persons shall be warned against wearing clothing that has become hard and stiff with cement.

(vi) Persons shall be instructed to report any susceptibility of their skin to cement and lime burns.

(vii) A hand cream or vaseline and eye wash shall be provided and kept ready for use to prevent burns.

(viii) Lime shall be stored in a dry place to prevent a premature slacking action that may cause fire.

(e) Materials shall not be stored on scaffolds or runways in excess of supplies needed for immediate operations.

(f) Brick stacks shall not be more than 7 feet in height. When a loose brick stack reaches a height of 4 feet, it shall be tapered back 2 inches in every foot of height above the 4-foot level.

(i) Brick shall never be stacked, for storage purposes, on scaffolds or runways.

(ii) When delivering brick on scaffolds inside the wall lines in wheelbarrows, they shall be dumped toward the inside of the building and not toward the wall.

(iii) Blocks shall always be stacked and not thrown in a loose pile.

(g) When masonry blocks are stacked higher than 6 feet, the stack shall be tapered back one-half block per tier above the 6-foot level.

(i) When blocks are stacked inside a building, the piles shall be so distributed as not to overload the floor on which they stand.

(ii) Blocks shall not be dropped or thrown from an elevation or delivered through chutes.

(h) Lumber:

(i) Used lumber shall have all nails withdrawn before stacking.

(ii) Lumber shall be stacked on level and solidly supported sills.

(iii) Lumber shall be so stacked as to be stable and self-supporting.

(iv) Lumber stacks shall not exceed 20 feet in height provided that lumber to be handled manually shall not be stacked more than 16 feet high.

(v) All stored lumber shall be stacked on timber sills to keep it off the ground. Sills shall be placed level on solid supports.

(vi) Cross strips shall be placed in the stacks when they are stacked more than four feet high.

(i) Structural steel, poles, pipe, bar stock, and other cylindrical materials, unless racked, shall be stacked and blocked so as to prevent spreading or tilting.

(i) Persons handling reinforcing steel shall wear heavy gloves.

(ii) When bending of reinforcing steel is done on the job, a strong bench shall be provided, set up on even dry ground or a floor for the persons to work on.

(iii) Structural steel shall be carefully piled to prevent danger of members rolling off or the pile toppling over.

(iv) Structural steel shall be kept in low piles, consideration being given to the sequence of use of the members.

(v) Corrugated and flat iron shall be stacked in flat piles, with the piles not more than four feet high and spacing strips shall be placed between each bundle.

(j) Sand, gravel and crushed stone.

(i) Stock piles shall be frequently inspected to prevent their becoming unsafe by continued adding to or withdrawing from the stock.

(ii) If material becomes frozen, it shall not be removed in a manner that would produce an overhang.

[Statutory Authority: Chapter 49.17 RCW. 95-10-016, § 296-155-325, filed 4/25/95, effective 10/1/95; 94-15-096 (Order 94-07), § 296-155-325, filed 7/20/94, effective 9/20/94. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-325, filed 1/21/86; Order 74-26, § 296-155-325, filed 5/7/74, effective 6/6/74.]

WAC 296-155-330 Rigging equipment for material handling. (1) General.

(a) Rigging equipment for material handling shall be inspected prior to use on each shift and as necessary during its use to ensure that it is safe. Defective rigging equipment shall be removed from service.

(b) Rigging equipment shall not be loaded in excess of its recommended safe working load, as prescribed in Tables F-1 through F-20 in this part and shall comply with ANSI B 30.9-1984.

(c) Rigging equipment, when not in use, shall be removed from the immediate work area so as not to present a hazard to employees.

(d) Special custom design grabs, hooks, clamps, or other lifting accessories shall be marked to indicate the safe working loads and shall be proof-tested to 125 percent of the rated load prior to use. Such custom devices shall be permanently marked with an identification number and permanent records shall be maintained on the jobsite for each device.

(2) Alloy steel chains. Chains used for overhead lifting shall be proof tested alloy steel.

(a) Welded alloy steel chain slings shall have permanently affixed durable identification stating size, grade, rated capacity, and sling manufacturer.

(b) Hooks, rings, oblong links, pear-shaped links, welded or mechanical coupling links, or other attachments, when used with alloy steel chains, shall have a rated capacity at least equal to that of the chain.

(c) The use of job or shop hooks and links, or makeshift fasteners, formed from bolts, rods, etc., or other such attachments, shall be prohibited.

(d) Rated capacity (working load limit) for alloy steel chain slings shall conform to the values shown in Table F-1.

(e) Whenever wear at any point of any chain link exceeds that shown in Table F-2, the assembly shall be removed from service.

(f) If at any time any three foot length of chain is found to have stretched one-third the length of a link it shall be discarded.

(g) The practice of placing bolts or nails between two links to shorten chains is prohibited.

(h) Splicing broken chains by inserting a bolt between two links with the heads of the bolt and the nut sustaining the load, or passing one link through another and inserting a bolt or nail to hold it, is prohibited.

(i) Wherever annealing of chains is attempted, it shall be done in properly equipped annealing furnaces and under the direct supervision of a competent person.

(3) Wire rope.

(a) Table F-3 through F-14 shall be used to determine the safe working loads of various sizes and classifications of improved plow steel wire rope and wire rope slings with various types of terminals. For sizes, classifications, and grades not included in these tables, the safe working load recommended by the manufacturer for specific, identifiable products shall be followed, provided that a safety factor of not less than 5 is maintained.

(b) Protruding ends of strands in splices on slings and bridles shall be covered or blunted.

(c) Wire rope shall not be secured by knots.

(d) The following limitations shall apply to the use of wire rope:

(i) An eye splice made in any wire rope shall have not less than three full tucks.

Note: This requirement shall not preclude the use of another form of splice or connection which can be shown to be as efficient and which is not otherwise prohibited.

(ii) Except for eye splices in the ends of wires and for endless rope slings, each wire rope used in hoisting or lowering, or in pulling loads, shall consist of one continuous piece without knot or splice.

(iii) Wire rope shall not be used, if in any length of eight diameters, the total number of visible broken wires exceeds 10 percent of the total number of wires, or if the rope shows other signs of excessive wear, corrosion, or defect.

(e) When U-bolt wire rope clips are used to form eyes, Table F-20 shall be used to determine the number and spacing of clips.

(f) When used for eye splices, the U-bolt shall be applied so that the "U" section is in contact with the dead end of the rope.

(g) U-Bolt wire rope clips shall be made of drop-forged steel.

Note: See Table F-20 for number of clamps and spacing requirements.

CORRECT METHOD OF ATTACHING WIRE ROPE CLIPS



U-Bolt of all clips on dead end of rope

(h) Slings shall not be shortened with knots or bolts or other makeshift devices.

(4) Natural rope, and synthetic fiber.

(a) General. When using natural or synthetic fiber rope slings, Tables F-15, F-16, F-17 and F-18 shall apply.

(b) All splices in rope slings provided by the employer shall be made in accordance with fiber rope manufacturers' recommendations.

(i) In manila rope, eye splices shall contain at least three full tucks, and short splices shall contain at least six full tucks (three on each side of the centerline of the splice).

(ii) In layed synthetic fiber rope, eye splices shall contain at least four full tucks, and short splices shall contain at least eight full tucks (four on each side of the centerline of the splice).

(iii) Strand end tails shall not be trimmed short (flush with the surface of the rope) immediately adjacent to the full tucks. This precaution applies to both eye and short splices and all types of fiber rope. For fiber ropes under 1-inch diameter, the tails shall project at least six rope diameters beyond the last full tuck. For fiber ropes 1-inch diameter and larger, the tails shall project at least 6 inches beyond the last full tuck. In applications where the projecting tails may be objectionable, the tails shall be tapered and spliced into the body of the rope using at least two additional tucks (which will require a tail length of approximately six rope diameters beyond the last full tuck).

(iv) For all eye splices, the eye shall be sufficiently large to provide an included angle of not greater than 60° at the splice when the eye is placed over the load or support.

(v) Knots shall not be used in lieu of splices.

(vi) All fibre rope used for hoisting purposes or for the support of scaffolds, or any part thereof, shall be of high grade Manila hemp (abaca). Fibre rope used for the support of scaffolds, or any part thereof, except rope used for lashing or tying purposes, shall be not less than 3/4-inch in diameter.

(vii) The maximum safe working load for fibre rope shall not exceed the maximum strength as shown in the following table:

**STRENGTH OF HIGH GRADE MANILA (ABACA) ROPE
COMMON LAY THREE STRAND**

Approximate Diameter in inches	Circumference in inches	Safe Load in Pounds
3/16 (6 yarns)	1/2	98
1/4 (6 yarns)	3/4	116
5/16 (6 yarns)	1	200
3/8 (12 yarns)	1 1/8	241
7/16 (15 yarns)	1 1/4	291
15/32 (18 yarns)	1 3/8	350
1/2 (21 yarns)	1 1/2	408
9/16	1 3/4	526
5/8	2	666
3/4	2 1/4	816
13/16	2 1/2	983
7/8	2 3/4	1,166
1	3	1,366
1 1/16	3 1/4	1,683
1 1/8	3 1/2	1,833
1 1/4	3 3/4	2,083
1 5/16	4	2,365
1 3/8	4 1/4	2,666
1 1/2	4 1/2	2,916

Note: This table is based on data contained in the U.S. Department of Commerce circular of the Bureau of Standards, No. 324.

(5) Synthetic webbing (nylon, polyester, and polypropylene).

(a) The employer shall have each synthetic web sling marked or coded to show:

- (i) Name or trademark of manufacturer.
- (ii) Rated capacities for the type of hitch.
- (iii) Type of material.
- (b) Rated capacity shall not be exceeded.
- (6) Shackles and hooks.

(a) Table F-19 shall be used to determine the safe working loads of various sizes of shackles, except that higher safe working loads are permissible when recommended by the manufacturer for specific, identifiable products, provided that a safety factor of not less than 5 is maintained.

(b) The manufacturer's recommendations shall be followed in determining the safe working loads of the various sizes and types of specific and identifiable hooks. All hooks for which no applicable manufacturer's recommendations are available shall be tested to twice the intended safe working load before they are initially put into use. The employer shall maintain a record of the dates and results of such tests.

(c) Hooks shall not be modified by welding and/or drilling unless written approval by the manufacturer has been received.

(7) Slings.

(a) When slings are provided as a part of the hoisting equipment, every precaution shall be taken to keep them in a serviceable condition.

(i) Wire rope slings shall be frequently inspected and oiled.

(ii) Slings shall not be left where they can be damaged by traffic or form stumbling hazards.

(iii) Blocks or heavy bagging shall be used at corners of the load to protect the sling from sharp bending.

(b) When a load is lifted by a multiple rope sling the sling shall be so arranged that the strain can be equalized between the ropes.

(i) When using a sling with both ends engaged in the hoisting block, the sling shall be adjusted so as to equalize the stress.

(ii) Slings shall be placed on the load at safe lifting angles.

(8) Material handling—General.

(a) When necessary to store building material on public thoroughfares, care shall be exercised to see that it is so piled or stacked as to be safe against collapse or falling over.

(b) Material shall be so located as not to interfere with, or present a hazard to employees, traffic or the public.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-330, filed 7/20/94, effective 9/20/94. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-330, filed 1/21/86. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240. 79-08-115 (Order 79-9), § 296-155-330, filed 7/31/79; Order 76-29, § 296-155-330, filed 9/30/76; Order 74-26, § 296-155-330, filed 5/7/74, effective 6/6/74.]

WAC 296-155-335 Disposal of waste materials. (1)

Whenever materials are dropped more than 20 feet to any point lying outside the exterior walls of the building, an enclosed chute of wood, or equivalent material, shall be used. For the purpose of this subsection, an enclosed chute is a slide, closed in on all sides, through which material is moved from a high place to a lower one.

(2) When debris is dropped without the use of chutes, the area onto which the material is dropped shall be com-

pletely enclosed with barricades not less than 42 inches high and not less than 20 feet back from the projected edge of the opening above. Signs warning of the hazard of falling materials shall be posted at each level. Removal shall not be permitted in this lower area until debris handling ceases above.

(3) All scrap lumber, waste material, and rubbish shall be removed from the immediate work area as the work progresses.

(4) Disposal of waste material or debris by burning shall comply with local fire regulations.

(5) All solvent waste, oily rags, and flammable liquids shall be kept in fire resistant covered containers until removed from the worksite.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-335, filed 1/21/86; Order 74-26, § 296-155-335, filed 5/7/74, effective 6/6/74.]

WAC 296-155-34901 Table F-1.

TABLE F-1

RATED CAPACITY (WORKING LOAD LIMIT),
FOR ALLOY STEEL CHAIN SLINGS*
RATED CAPACITY
(WORKING LOAD LIMIT), POUNDS

TABLE F-1: PART 1—Double Slings

Chain Size, Inches	Single Branch Sling - 90 degrees Loading	Double Sling Vertical Angle ¹		
		30 degree	45 degree	60 degree
		Horizontal Angle ²		
		60 degree	45 degree	30 degree
1/4	3,250	5,560	4,550	3,250
3/8	6,600	11,400	9,300	6,600
1/2	11,250	19,500	15,900	11,250
5/8	16,500	28,500	23,300	16,500
3/4	23,000	39,800	32,500	23,000
7/8	28,750	49,800	40,600	28,750
1	38,750	67,100	54,800	38,750
1-1/8	44,500	77,000	63,000	44,500
1-1/4	57,500	99,500	81,000	57,500
1-3/8	67,000	116,000	94,000	67,000
1-1/2	80,000	138,000	112,500	80,000
1-3/4	100,000	172,000	140,000	100,000

TABLE F-1: PART 2—Triple and Quadruple Slings

Chain Size, Inches	Single Branch Sling - 90 degrees Loading	Triple and Quadruple Sling Vertical Angle ¹		
		30 degree	45 degree	60 degree
		Horizontal Angle ²		
		60 degree	45 degree	30 degree
1/4	3,250	8,400	6,800	4,900
3/8	6,600	17,000	14,000	9,900
1/2	11,250	29,000	24,000	17,000
5/8	16,000	43,000	35,000	24,500

3/4	23,000	59,500	48,500	34,500
7/8	28,750	74,500	61,000	43,000
1	38,750	101,000	82,000	58,000
1-1/8	44,500	115,500	94,500	66,500
1-1/4	57,500	149,000	121,500	86,000
1-3/8	67,000	174,000	141,000	100,500
1-1/2	80,000	207,000	169,000	119,500
1-3/4	100,000	258,000	210,000	150,000

- ¹ Rating of multileg slings adjusted for angle of loading measured as the included angle between the inclined leg and the vertical.
- ² Rating of multileg slings adjusted for angle of loading between the inclined leg and the horizontal plane of the load.
- * Other grades of proof tested steel chain include proof coil, BBB coil and hi-test chain. These grades are not recommended for overhead lifting and therefore are not covered by this standard.

[Order 74-26, § 296-155-335 (part), Table F-1 (codified as WAC 296-155-34901), filed 5/7/74, effective 6/6/74.]

WAC 296-155-34902 Table F-2.

TABLE F-2

MAXIMUM ALLOWABLE WEAR AT ANY POINT OF LINK

Chain Size (inches)	Maximum Allowable Wear (inch)
1/4	3/64
3/8	5/64
1/2	7/64
5/8	9/64
3/4	5/32
7/8	11/64
1	3/16
1 1/8	7/32
1 1/4	1/4
1 3/8	9/32
1 1/2	5/16
1 3/4	11/32

[Order 74-26, § 296-155-335 (part), Table F-2 (codified as WAC 296-155-34902), filed 5/7/74, effective 6/6/74.]

WAC 296-155-34903 Table F-3.

TABLE F-3

RATED CAPACITIES FOR SINGLE LEG SLINGS
6 x 19 and 6 x 37 CLASSIFICATION
IMPROVED PLOW STEEL GRADE ROPE
WITH FIBER CORE (FC)

Rope		Rated Capacities, Tons (2,000 lb)								
Dia. Constr. (Inches)		Vertical			Choker			Vertical Basket*		
		HT	MS	S	HT	MS	S	HT	MS	S
1/4	6x19	0.49	0.51	0.55	0.37	0.38	0.41	0.99	1.0	1.1
5/16	6x19	0.76	0.79	0.85	0.57	0.59	0.64	1.5	1.6	1.7
3/8	6x19	1.1	1.1	1.2	0.80	0.85	0.91	2.1	2.2	2.4
7/16	6x19	1.4	1.5	1.6	1.1	1.1	1.2	2.9	3.0	3.3
1/2	6x19	1.8	2.0	2.1	1.4	1.5	1.6	3.7	3.9	4.3
9/16	6x19	2.3	2.5	2.7	1.7	1.9	2.0	4.6	5.0	5.4
5/8	6x19	2.8	3.1	3.3	2.1	2.3	2.5	5.6	6.2	6.7
3/4	6x19	3.9	4.4	4.8	2.9	3.3	3.6	7.8	8.8	9.5
7/8	6x19	5.1	5.9	6.4	3.9	4.5	4.8	10.0	12.0	13.0
1	6x19	6.7	7.7	8.4	5.0	5.8	6.3	13.0	15.0	17.0
1- 1/8	6x19	8.4	9.5	10.0	6.3	7.1	7.9	17.0	19.0	21.0
1- 1/4	6x37	9.8	11.0	12.0	7.4	8.3	9.2	20.0	22.0	25.0
1- 3/8	6x37	12.0	13.0	15.0	8.9	10.0	11.0	24.0	27.0	30.0
1- 1/2	6x37	14.0	16.0	17.0	10.0	12.0	13.0	28.0	32.0	35.0
1- 5/8	6x37	16.0	18.0	21.0	12.0	14.0	15.0	33.0	37.0	41.0

1- 3/4	6x37	19.0	21.0	24.0	14.0	16.0	18.0	38.0	43.0	48.0
2	6x37	25.0	28.0	31.0	18.0	21.0	23.0	49.0	55.0	62.0

- HT = Hand tucked splice and hidden tuck splice.
For hidden tuck splice (IWRC) use value in HT column.
- MS = Mechanical splice.
- S = Swaged or zinc poured socket.
- * These values only apply when the D/d ratio for HT slings is 10 or greater, and for MS and S slings is 20 or greater where:
D = Diameter of curvature around which the body of the sling is bent.
d = Diameter of rope.

[Order 74-26, § 296-155-335 (part), Table F-3 (codified as WAC 296-155-34903), filed 5/7/74, effective 6/6/74.]

WAC 296-155-34904 Table F-4.

TABLE F-4

RATED CAPACITIES FOR SINGLE LEG SLINGS
6 x 19 and 6 x 37 CLASSIFICATION
IMPROVED PLOW STEEL GRADE ROPE
WITH INDEPENDENT WIRE ROPE CORE (IWRC)

Rope		Rated Capacities, Tons (2,000 lb)								
Dia. Constr. (Inches)		Vertical			Choker			Vertical Basket*		
		HT	MS	S	HT	MS	S	HT	MS	S
1/4	6x19	0.53	0.56	0.59	0.40	0.42	0.44	1.0	1.1	1.2
5/16	6x19	0.81	0.87	0.92	0.61	0.65	0.69	1.6	1.7	1.8
3/8	6x19	1.1	1.2	1.3	0.86	0.93	0.98	2.3	2.5	2.6
7/16	6x19	1.5	1.7	1.8	1.2	1.3	1.3	3.1	3.4	3.5
1/2	6x19	2.0	2.2	2.3	1.5	1.6	1.7	3.9	4.4	4.6
9/16	6x19	2.5	2.7	2.9	1.8	2.1	2.2	4.9	5.5	5.8
5/8	6x19	3.0	3.4	3.6	2.2	2.5	2.7	6.0	6.8	7.2
3/4	6x19	4.2	4.9	5.1	3.1	3.6	3.8	8.4	9.7	10.0
7/8	6x19	5.5	6.6	6.9	4.1	4.9	5.2	11.0	13.0	14.0
1	6x19	7.2	8.5	9.0	5.4	6.4	6.7	14.0	17.0	18.0
1- 1/8	6x19	9.0	10.0	11.0	6.8	7.8	8.5	18.0	21.0	23.0
1- 1/4	6x37	10.0	12.0	13.0	7.9	9.2	9.9	21.0	24.0	26.0
1- 3/8	6x37	13.0	15.0	16.0	9.6	11.0	12.0	25.0	29.0	32.0
1- 1/2	6x37	15.0	17.0	19.0	11.0	13.0	14.0	30.0	35.0	38.0
1- 5/8	6x37	18.0	20.0	22.0	13.0	15.0	17.0	35.0	41.0	44.0
1- 3/4	6x37	20.0	24.0	26.0	15.0	18.0	19.0	41.0	47.0	51.0
2	6x37	26.0	30.0	33.0	20.0	23.0	25.0	53.0	61.0	66.0

- HT = Hand tucked splice.
For hidden tuck splice (IWRC) use Table F3 values in HT column.
- MS = Mechanical splice.
- S = Swaged or zinc poured socket.
- * These values only apply when the D/d ratio for HT slings is 10 or greater, and for MS and S slings is 20 or greater where:
D = Diameter of curvature around which the body of the sling is bent.
d = Diameter of rope.

[Order 74-26, § 296-155-335 (part), Table F-4 (codified as WAC 296-155-34904), filed 5/7/74, effective 6/6/74.]

WAC 296-155-34905 Table F-5.

TABLE F-5

RATED CAPACITIES FOR SINGLE LEG SLINGS
CABLE LAND ROPE -
MECHANICAL SPLICE ONLY
7 x 7 x 7 & 7 x 7 x 19 CONSTRUCTIONS
GALVANIZED AIRCRAFT GRADE ROPE
7 x 6 x 19 IWRC CONSTRUCTION
IMPROVED PLOW STEEL GRADE ROPE

Rope		Rated Capacities, Tons (2,000 lb)		
Dia. (Inches)	Constr.	Vertical	Choker	Vertical Basket*
1/4	7x7x7	0.50	0.38	1.0
3/8	7x7x7	1.1	.81	2.2
1/2	7x7x7	1.8	1.4	3.7
5/8	7x7x7	2.8	2.1	5.5
3/4	7x7x7	3.8	2.9	7.6
5/8	7x7x19	2.9	2.2	5.8
3/4	7x7x19	4.1	3.0	8.1
7/8	7x7x19	5.4	4.0	11.0
1	7x7x19	6.9	5.1	14.0
1- 1/8	7x7x19	8.2	6.2	16.0
1- 1/4	7x7x19	9.9	7.4	20.0
3/4	7x6x19 IWRC	3.8	2.8	7.6
7/8	7x6x19 IWRC	5.0	3.8	10.0
1	7x6x19 IWRC	6.4	4.8	13.0
1- 1/8	7x6x19 IWRC	7.7	5.8	15.0
1- 1/4	7x6x19 IWRC	9.2	6.9	18.0
1- 5/16	7x6x19 IWRC	10.0	7.5	20.0
1- 3/8	7x6x19 IWRC	11.0	8.2	22.0
1- 1/2	7x6x19 IWRC	13.0	9.6	26.0

* These values only apply when the D/d ratio is 10 or greater where:
 D = Diameter of curvature around which the body of the sling is bent.
 d = Diameter of rope.

[Order 74-26, § 296-155-335 (part), Table F-5 (codified as WAC 296-155-34905), filed 5/7/74, effective 6/6/74.]

WAC 296-155-34906 Table F-6.

TABLE F-6

RATED CAPACITIES FOR SINGLE LEG SLINGS 8-PART AND 6-PART BRAIDED ROPE 6 x 7 AND 6 x 19 CONSTRUCTION IMPROVED PLOW STEEL GRADE ROPE 7 x 7 CONSTRUCTION GALVANIZED AIRCRAFT GRADE ROPE

Component Ropes		Rated Capacities, Tons (2,000 lb)					
Diameter (inches)	Constr.	Vertical		Choker		Basket Vertical to 30 degrees*	
		8-Part	6-Part	8-Part	6-Part	8-Part	6-Part
3/32	6 x 7	0.42	0.32	0.32	0.24	0.74	0.55
1/8	6 x 7	0.76	0.57	0.57	0.42	1.3	0.98
3/16	6 x 7	1.7	1.3	1.3	0.94	2.9	2.2
3/32	7 x 7	0.51	0.39	0.38	0.29	0.89	0.67
1/8	7 x 7	0.95	0.71	0.71	0.53	1.6	1.2
3/16	7 x 7	2.1	1.5	1.5	1.2	3.6	2.7
3/16	6 x 19	1.7	1.3	1.3	0.98	3.0	2.2
1/4	6 x 19	3.1	2.3	2.3	1.7	5.3	4.0
5/16	6 x 19	4.8	3.6	3.6	2.7	8.3	6.2
3/8	6 x 19	6.8	5.1	5.1	3.8	12.0	8.9
7/16	6 x 19	9.3	6.9	6.9	5.2	16.0	12.0
1/2	6 x 19	12.0	9.0	9.0	6.7	21.0	15.0
9/16	6 x 19	15.0	11.0	11.0	8.5	26.0	20.0
5/8	6 x 19	19.0	14.0	14.0	10.0	32.0	24.0
3/4	6 x 19	27.0	20.0	20.0	15.0	46.0	35.0
7/8	6 x 19	36.0	27.0	27.0	20.0	62.0	47.0
1	6 x 19	47.0	35.0	35.0	26.0	81.0	61.0

* These values only apply when the D/d ratio is 20 or greater where:
 D = Diameter of curvature around which the body of the sling is bent.
 d = Diameter of component rope.

[Order 74-26, § 296-155-335 (part), Table F-6 (codified as WAC 296-155-34906), filed 5/7/74, effective 6/6/74.]

WAC 296-155-34907 Table F-7.

TABLE F-7

RATED CAPACITIES FOR 2-LEG & 3-LEG BRIDLE SLINGS 6 x 19 AND 6 x 37 CLASSIFICATION IMPROVED PLOW STEEL GRADE ROPE WITH FIBER CORE (FC)

TABLE F-7: PART 1—2-Leg Bridle Slings

Rope		Rated Capacities, Tons (2,000 lb)					
Dia. (Inches)	Constr.	Vert 30 degree		45 degree Angle		Vert 60 degree	
		Horz 60 degree	HT	MS	HT	MS	Horz 30 degree
1/4	6 x 19	0.85	0.88	0.70	0.72	0.49	0.51
5/16	6 x 19	1.3	1.4	1.1	1.1	0.76	0.79
3/8	6 x 19	1.8	1.9	1.5	1.6	1.1	1.1
7/16	6 x 19	2.5	2.6	2.0	2.2	1.4	1.5
1/2	6 x 19	3.2	3.4	2.6	2.8	1.8	2.0
9/16	6 x 19	4.0	4.3	3.2	3.5	2.3	2.5
5/8	6 x 19	4.8	5.3	4.0	4.4	2.8	3.1
3/4	6 x 19	6.8	7.6	5.5	6.2	3.9	4.4
7/8	6 x 19	8.9	10.0	7.3	8.4	5.1	5.9
1	6 x 19	11.0	13.0	9.4	11.0	6.7	7.7
1- 1/8	6 x 19	14.0	16.0	12.0	13.0	8.4	9.5
1- 1/4	6 x 37	17.0	19.0	14.0	16.0	9.8	11.0
1- 3/8	6 x 37	20.0	23.0	17.0	19.0	12.0	13.0
1- 1/2	6 x 37	24.0	27.0	20.0	22.0	14.0	16.0
1- 5/8	6 x 37	28.0	32.0	23.0	26.0	16.0	18.0
1- 3/4	6 x 37	33.0	37.0	27.0	30.0	19.0	21.0
2	6 x 37	43.0	48.0	35.0	39.0	25.0	28.0

HT = Hand tucked splice.
 MS = Mechanical splice.

TABLE F-7: PART 2—3-Leg Bridle Slings

Rope		Rated Capacities, Tons (2,000 lb)					
Dia. (Inches)	Constr.	Vert 30 degree		45 degree Angle		Vert 60 degree	
		Horz 60 degree	HT	MS	HT	MS	Horz 30 degree
1/4	6 x 19	1.3	1.3	1.0	1.1	0.74	0.7
5/16	6 x 19	2.0	2.0	1.6	1.7	1.1	1.2
3/8	6 x 19	2.8	2.9	2.3	2.4	1.6	1.7
7/16	6 x 19	3.7	4.0	3.0	3.2	2.1	2.3
1/2	6 x 19	4.8	5.1	3.9	4.2	2.8	3.0
9/16	6 x 19	6.0	6.5	4.9	5.3	3.4	3.7
5/8	6 x 19	7.3	8.0	5.9	6.5	4.2	4.6
3/4	6 x 19	10.0	11.0	8.3	9.3	5.8	6.6
7/8	6 x 19	13.0	15.0	11.0	13.0	7.7	8.9

1	6 x 19	17.0	20.0	14.0	16.0	10.0	11.0
1- 1/8	6 x 19	22.0	24.0	18.0	20.0	13.0	14.0
1- 1/4	6 x 37	25.0	29.0	21.0	23.0	15.0	17.0
1- 3/8	6 x 37	31.0	35.0	25.0	28.0	18.0	20.0
1- 1/2	6 x 37	36.0	41.0	30.0	33.0	21.0	24.0
1- 5/8	6 x 37	43.0	48.0	35.0	39.0	25.0	28.0
1- 3/4	6 x 37	49.0	56.0	40.0	45.0	28.0	32.0
2	6 x 37	64.0	72.0	52.0	59.0	37.0	41.0

HT = Hand tucked splice.
MS = Mechanical splice.

[Order 74-26, § 296-155-335 (part), Table F-7 (codified as WAC 296-155-34907), filed 5/7/74, effective 6/6/74.]

WAC 296-155-34908 Table F-8.

TABLE F-8
RATED CAPACITIES FOR 2-LEG
& 3-LEG BRIDLE SLINGS
6 x 19 AND 6 x 37 CLASSIFICATION
IMPROVED PLOW STEEL GRADE ROPE
WITH INDEPENDENT WIRE
ROPE CORE (IWRC)

TABLE F-8: PART 1—2-Leg Bridle Slings

Rope		Rated Capacities, Tons (2,000 lb)					
		2-Leg Bridle Slings					
Dia. (Inches)	Constr.	Vert 30 degree Horz 60 degree		45 degree Angle		Vert 60 degree Horz 30 degree	
		HT	MS	HT	MS	HT	MS
1/4	6 x 19	0.92	0.97	0.75	0.79	0.53	0.56
5/16	6 x 19	1.4	1.5	1.1	1.2	1.81	0.87
3/8	6 x 19	2.0	2.1	1.6	1.8	1.1	1.2
7/16	6 x 19	2.7	2.9	2.2	2.4	1.5	1.7
1/2	6 x 19	3.4	3.8	2.8	3.1	2.0	2.2
9/16	6 x 19	4.3	4.8	3.5	3.9	2.5	2.7
5/8	6 x 19	5.2	5.9	4.2	4.8	3.0	3.4
3/4	6 x 19	7.3	8.4	5.9	6.9	4.2	4.9
7/8	6 x 19	9.6	11.0	7.8	9.3	5.5	6.6
1	6 x 19	12.0	15.0	10.0	12.0	7.2	8.5
1- 1/8	6 x 19	16.0	18.0	13.0	15.0	9.0	10.0
1- 1/4	6 x 37	18.0	21.0	15.0	17.0	10.0	12.0
1- 3/8	6 x 37	22.0	25.0	18.0	21.0	13.0	15.0
1- 1/2	6 x 37	26.0	30.0	21.0	25.0	15.0	17.0
1- 5/8	6 x 37	31.0	35.0	25.0	29.0	18.0	20.0
1- 3/4	6 x 37	35.0	41.0	29.0	33.0	20.0	24.0
2	6 x 37	46.0	53.0	37.0	43.0	26.0	30.0

HT = Hand tucked splice.
MS = Mechanical splice.

TABLE F-8: PART 2—3-Leg Bridle Slings

Rope		Rated Capacities, Tons (2,000 lb)					
		3-Leg Bridle Slings					
Dia. (Inches)	Constr.	Vert 30 degree Horz 60 degree		45 degree Angle		Vert 60 degree Horz 30 degree	
		HT	MS	HT	MS	HT	MS
1/4	6 x 19	1.4	1.4	1.1	1.2	0.79	0.84
5/16	6 x 19	2.1	2.3	1.7	1.8	1.2	1.3
3/8	6 x 19	3.0	3.2	2.4	2.6	1.7	1.9
7/16	6 x 19	4.0	4.4	3.3	3.6	2.3	2.5
1/2	6 x 19	5.1	5.7	4.2	4.6	3.0	3.3
9/16	6 x 19	6.4	7.1	5.2	5.8	3.7	4.1
5/8	6 x 19	7.8	8.8	6.4	7.2	4.5	5.1
3/4	6 x 19	11.0	13.0	8.9	10.0	6.3	7.3
7/8	6 x 19	14.0	17.0	12.0	14.0	8.3	9.9
1	6 x 19	19.0	22.0	15.0	18.0	11.0	13.0
1- 1/8	6 x 19	23.0	27.0	19.0	22.0	13.0	16.0
1- 1/4	6 x 37	27.0	32.0	22.0	26.0	16.0	18.0
1- 3/8	6 x 37	33.0	38.0	27.0	31.0	19.0	22.0
1- 1/2	6 x 37	39.0	45.0	32.0	37.0	23.0	26.0
1- 5/8	6 x 37	46.0	53.0	38.0	43.0	27.0	31.0
1- 3/4	6 x 37	53.0	61.0	43.0	50.0	31.0	35.0
2	6 x 37	68.0	79.0	56.0	65.0	40.0	46.0

HT = Hand tucked splice
MS = Mechanical splice

[Order 74-26, § 296-155-335 (part), Table F-8 (codified as WAC 296-155-34908), filed 5/7/74, effective 6/6/74.]

WAC 296-155-34909 Table F-9.

TABLE F-9
RATED CAPACITIES FOR 2-LEG
AND 3-LEG BRIDLE SLINGS
CABLE LAID ROPE -
MECHANICAL SPLICE ONLY
7 x 7 x 7 AND 7 x 7 x 19 CONSTRUCTIONS
GALVANIZED AIRCRAFT GRADE ROPE
7 x 6 x 19 IWRC CONSTRUCTION IMPROVED
PLOW STEEL GRADE ROPE

TABLE F-9: PART 1—2-Leg Bridle Slings

Rope		Rated Capacities, Tons (2,000 lb)		
		2-Leg Bridle Sling		
Dia. (Inches)	Constr.	Vert 30 deg Horz 60 deg	45 degree Angle	Vert 60 deg Horz 30 deg
		1/4	7 x 7 x 7	0.87	0.71	0.50
3/8	7 x 7 x 7	1.9	1.5	1.1
1/2	7 x 7 x 7	3.2	2.6	1.8
5/8	7 x 7 x 7	4.8	3.9	2.8
3/4	7 x 7 x 7	6.6	5.4	3.8
5/8	7 x 7 x 19	5.0	4.1	2.9
3/4	7 x 7 x 19	7.0	5.7	4.1
7/8	7 x 7 x 19	9.3	7.6	5.4
1	7 x 7 x 19	12.0	9.7	6.9
1- 1/8	7 x 7 x 19	14.0	12.0	8.2
1- 1/4	7 x 7 x 19	17.0	14.0	9.9
3/4	7 x 6 x 19 IWRC	6.6	5.4	3.8
7/8	7 x 6 x 19 IWRC	8.7	7.1	5.0

1	7 x 6 x 19 IWRC	11.0	9.0	6.4
1- 1/8	7 x 6 x 19 IWRC	13.0	11.0	7.7
1- 1/4	7 x 6 x 19 IWRC	16.0	13.0	9.2
1- 5/16	7 x 6 x 19 IWRC	17.0	14.0	10.0
1- 3/8	7 x 6 x 19 IWRC	19.0	15.0	11.0
1- 1/2	7 x 6 x 19 IWRC	22.0	18.0	13.0

3/32	7 x 7	0.89	0.67	0.72	0.55	0.51	0.39
1/8	7 x 7	1.6	1.2	1.3	1.0	0.95	0.71
3/16	7 x 7	3.6	2.7	2.9	2.2	2.1	1.5
3/16	6 x 19	3.0	2.2	2.4	1.8	1.7	1.3
1/4	6 x 19	5.3	4.0	4.3	3.2	3.1	2.3
5/16	6 x 19	8.3	6.2	6.7	5.0	4.8	3.6
3/8	6 x 19	12.0	8.9	9.7	7.2	6.8	5.1
7/16	6 x 19	16.0	12.0	13.0	9.8	9.3	6.9
1/2	6 x 19	21.0	15.0	17.0	13.0	12.0	9.0
9/16	6 x 19	26.0	20.0	21.0	16.0	15.0	11.0
5/8	6 x 19	32.0	24.0	26.0	20.0	19.0	14.0
3/4	6 x 19	46.0	35.0	38.0	28.0	27.0	20.0
7/8	6 x 19	62.0	47.0	51.0	38.0	36.0	27.0
1	6 x 19	81.0	61.0	66.0	50.0	47.0	35.0

TABLE F-9: PART 2—3-Leg Bridle Slings

Rope		Rated Capacities, Tons (2,000 lb)			
Dia. (Inches)	Constr.	3-Leg Bridle Sling			
		Vert 30 deg Horz 60 deg	45 degree Angle	Vert 60 deg Horz 30 deg	
1/4	7 x 7 x 7	1.3	1.1	0.75	
3/8	7 x 7 x 7	2.8	2.3	1.6	
1/2	7 x 7 x 7	4.8	3.9	2.8	
5/8	7 x 7 x 7	7.2	5.9	4.2	
3/4	7 x 7 x 7	9.9	8.1	5.7	
5/8	7 x 7 x 19	7.5	6.1	4.3	
3/4	7 x 7 x 19	10.0	8.6	6.1	
7/8	7 x 7 x 19	14.0	11.0	8.1	
1	7 x 7 x 19	18.0	14.0	10.0	
1- 1/8	7 x 7 x 19	21.0	17.0	12.0	
1- 1/4	7 x 7 x 19	26.0	21.0	15.0	
3/4	7 x 6 x 19 IWRC	9.9	8.0	5.7	
7/8	7 x 6 x 19 IWRC	13.0	11.0	7.5	
1	7 x 6 x 19 IWRC	17.0	13.0	9.6	
1- 1/8	7 x 6 x 19 IWRC	20.0	16.0	11.0	
1- 1/4	7 x 6 x 19 IWRC	24.0	20.0	14.0	
1- 5/16	7 x 6 x 19 IWRC	26.0	21.0	15.0	
1- 3/8	7 x 6 x 19 IWRC	28.0	23.0	16.0	
1- 1/2	7 x 6 x 19 IWRC	33.0	27.0	19.0	

[Order 74-26, § 296-155-335 (part), Table F-9 (codified as WAC 296-155-34909), filed 5/7/74, effective 6/6/74.]

WAC 296-155-34910 Table F-10.

TABLE F-10
RATED CAPACITIES FOR 2-LEG
AND 3-LEG BRIDLE SLINGS
8-PART AND 6-PART BRAIDED ROPE
6 x 7 AND 6 x 19 CONSTRUCTION
IMPROVED PLOW STEEL GRADE ROPE
7 x 7 CONSTRUCTION GALVANIZED
AIRCRAFT GRADE ROPE

TABLE F-10: PART 1—2-Leg Bridle Slings

Component		Rated Capacities, Tons (2,000 lb)					
Rope		2-Leg Bridle Slings					
Dia. (Inches)	Constr.	Vert 30 degree Horz 60 degree		45 degree Angle		Vert 60 degree Horz 30 degree	
		8-Part	6-Part	8-Part	6-Part	8-Part	6-Part
3/32	6 x 7	0.74	0.55	0.60	0.45	0.42	0.32
1/8	6 x 7	1.3	0.98	1.1	0.80	0.76	0.57
3/16	6 x 7	2.9	2.2	2.4	1.8	1.7	1.3

TABLE F-10: PART 2—3-Leg Bridle Slings

Component		Rated Capacities, Tons (2,000 lb)					
Rope		3-Leg Bridle Slings					
Dia. (Inches)	Constr.	Vert 30 degree Horz 60 degree		45 degree Angle		Vert 60 degree Horz 30 degree	
		8-Part	6-Part	8-Part	6-Part	8-Part	6-Part
3/32	6 x 7	1.1	0.83	0.90	0.68	0.64	0.48
1/8	6 x 7	2.0	1.5	1.6	1.2	1.1	0.85
3/16	6 x 7	4.4	3.3	3.6	2.7	2.5	1.9
3/32	7 x 7	1.3	1.0	1.1	0.82	0.77	0.58
1/8	7 x 7	2.5	1.8	2.0	1.5	1.4	1.1
3/16	7 x 7	5.4	4.0	4.4	3.3	3.1	2.3
3/16	6 x 19	4.5	3.4	3.7	2.8	2.6	1.9
1/4	6 x 19	8.0	6.0	6.5	4.9	4.6	3.4
5/16	6 x 19	12.0	9.3	10.0	7.6	7.1	5.4
3/8	6 x 19	18.0	13.0	14.0	11.0	10.0	7.7
7/16	6 x 19	24.0	18.0	20.0	15.0	14.0	10.0
1/2	6 x 19	31.0	23.0	25.0	19.0	18.0	13.0
9/16	6 x 19	39.0	29.0	32.0	24.0	23.0	17.0
5/8	6 x 19	48.0	36.0	40.0	30.0	28.0	21.0
3/4	6 x 19	69.0	52.0	56.0	42.0	40.0	30.0
7/8	6 x 19	94.0	70.0	76.0	57.0	54.0	40.0
1	6 x 19	122.0	91.0	99.0	74.0	70.0	53.0

[Order 74-26, § 296-155-335 (part), Table F-10 (codified as WAC 296-155-34910), filed 5/7/74, effective 6/6/74.]

WAC 296-155-34911 Table F-11.

TABLE F-11
RATED CAPACITIES FOR STRAND LAID
GROMMET - HAND TUCKED IMPROVED
PLOW STEEL GRADE ROPE

Rope Body		Rated Capacities, Tons (2,000 lb)		
Dia. (inches)	Constr.	Vertical		Vertical Basket*
		Vertical	Choker	
1/4	7 x 19	0.85	0.64	1.7
5/16	7 x 19	1.3	1.0	2.6
3/8	7 x 19	1.9	1.4	3.8
7/16	7 x 19	2.6	1.9	5.2
1/2	7 x 19	3.3	2.5	6.7
9/16	7 x 19	4.2	3.1	8.4

5/8	7 x 19	5.2	3.9	10.00
3/4	7 x 19	7.4	5.6	15.0
7/8	7 x 19	10.0	7.5	20.0
1	7 x 19	13.0	9.7	26.0
1-1/8	7 x 19	16.0	12.0	32.0
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1-1/4	7 x 37	18.0	14.0	37.0
1-3/8	7 x 37	22.0	16.0	44.0
1-1/2	7 x 37	26.0	19.0	52.0

* These values only apply when the D/d ratio is 5 or greater where:
 D = Diameter of curvature around which rope is bent.
 d = Diameter of rope body.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-34911, filed 1/21/86; Order 74-26, § 296-155-335 (part), Table F-11 (codified as WAC 296-155-34911), filed 5/7/74, effective 6/6/74.]

WAC 296-155-34912 Table F-12.

TABLE F-12

RATED CAPACITIES FOR CABLE LAID GROMMET
 - HAND TUCKED 7 x 6 x 7 AND 7 x 6 x 19
 CONSTRUCTIONS IMPROVED PLOW
 STEEL GRADE ROPE
 7 x 7 x 7 CONSTRUCTION GALVANIZED
 AIRCRAFT GRADE ROPE

Cable Body		Rated Capacities, Tons (2,000 lb)		
Dia. (inches)	Constr.	Vertical	Choker	Vertical Basket*
3/8	7 x 6 x 7	1.3	0.95	2.5
9/16	7 x 6 x 7	2.8	2.1	5.6
5/8	7 x 6 x 7	3.8	2.8	7.6
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3/8	7 x 7 x 7	1.6	1.2	3.2
9/16	7 x 7 x 7	3.5	2.6	6.9
5/8	7 x 7 x 7	4.5	3.4	9.0
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5/8	7 x 6 x 19	3.9	3.0	7.9
3/4	7 x 6 x 19	5.1	3.8	10.0
15/16	7 x 6 x 19	7.9	5.9	16.0
1-1/8	7 x 6 x 19	11.0	8.4	22.0
1-5/16	7 x 6 x 19	15.0	11.0	30.0
1-1/2	7 x 6 x 19	19.0	14.0	39.0
1-11/16	7 x 6 x 19	24.0	18.0	49.0
1-7/8	7 x 6 x 19	30.0	22.0	60.0
2-1/4	7 x 6 x 19	42.0	31.0	84.0
2-5/8	7 x 6 x 19	56.0	42.0	112.0

* These values only apply when the D/d ratio is 5 or greater where:
 D = Diameter of curvature around which cable body is bent.
 d = Diameter of cable body.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-34912, filed 1/21/86; Order 74-26, § 296-155-335 (part), Table F-12 (codified as WAC 296-155-34912), filed 5/7/74, effective 6/6/74.]

WAC 296-155-34913 Table F-13.

TABLE F-13

RATED CAPACITIES FOR STRAND LAID
 ENDLESS SLINGS-MECHANICAL JOINT
 IMPROVED PLOW STEEL GRADE ROPE

ROPE BODY			RATED CAPACITIES, TONS (2,000 lb)		
Dia. (inches)	Constr.	Vertical	Choker	Vertical Basket*	
1/4	6 x 19 IWRC	0.92	0.69	1.8	
3/8	6 x 19 IWRC	2.0	1.5	4.1	
1/2	6 x 19 IWRC	3.6	2.7	7.2	
5/8	6 x 19 IWRC	5.6	4.2	11.0	
3/4	6 x 19 IWRC	8.0	6.0	16.0	
7/8	6 x 19 IWRC	11.0	8.1	21.0	
1	6 x 19 IWRC	14.0	10.0	28.0	
1-1/8	6 x 19 IWRC	18.0	13.0	35.0	
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1-1/4	6 x 37 IWRC	21.0	15.0	41.0	
1-3/8	6 x 37 IWRC	25.0	19.0	50.0	
1-1/2	6 x 37 IWRC	29.0	22.0	59.0	

* These values only apply when the D/d ratio is 5 or greater where:
 D = Diameter of curvature around which rope is bent.
 d = Diameter of rope body.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-34913, filed 1/21/86; Order 74-26, § 296-155-335 (part), Table F-13 (codified as WAC 296-155-34913), filed 5/7/74, effective 6/6/74.]

WAC 296-155-34914 Table F-14.

TABLE F-14

RATED CAPACITIES FOR CABLE LAID
 ENDLESS SLINGS-MECHANICAL JOINT
 7 x 7 x 7 AND 7 x 7 x 19 CONSTRUCTIONS
 GALVANIZED AIRCRAFT GRADE ROPE
 7 x 6 x 19 IWRC CONSTRUCTION IMPROVED
 PLOW STEEL GRADE ROPE

CABLE BODY		RATED CAPACITIES, TONS (2,000 lb)		
Dia. (inches)	Constr.	Vertical	Choker	Vertical Basket*
1/4	7 x 7 x 7	0.83	0.62	1.6
3/8	7 x 7 x 7	1.8	1.3	3.5
1/2	7 x 7 x 7	3.0	2.3	6.1
5/8	7 x 7 x 7	4.5	3.4	9.1
3/4	7 x 7 x 7	6.3	4.7	12.0
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5/8	7 x 7 x 19	4.7	3.5	9.5
3/4	7 x 7 x 19	6.7	5.0	13.0
7/8	7 x 7 x 19	8.9	6.6	18.0
1	7 x 7 x 19	11.0	8.5	22.0
1-1/8	7 x 7 x 19	14.0	10.0	28.0
1-1/4	7 x 7 x 19	17.0	12.0	33.0
<hr/>				
3/4	7 x 6 x 19 IWRC	6.2	4.7	12.0
7/8	7 x 6 x 19 IWRC	8.3	6.2	16.0
1	7 x 6 x 19 IWRC	10.0	7.9	21.0
1-1/8	7 x 6 x 19 IWRC	13.0	9.7	26.0
1-1/4	7 x 6 x 19 IWRC	16.0	12.0	31.0
1-3/4	7 x 6 x 19 IWRC	18.0	14.0	37.0
1-1/2	7 x 6 x 19 IWRC	22.0	16.0	43.0

* These values only apply when the D/d value is 5 or greater where:
 D = Diameter of curvature around which cable body is bent.
 d = Diameter of cable body.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-34914, filed 1/21/86; Order 74-26, § 296-155-335 (part), Table F-14 (codified as WAC 296-155-34914), filed 5/7/74, effective 6/6/74.]

WAC 296-155-34915 Table F-15.

TABLE F-15

MANILA ROPE SLINGS

TABLE F-15: PART 1—Eye and Eye Sling

RATED CAPACITY IN POUNDS (Safety Factor = 5)								
EYE AND EYE SLING								
BASKET HITCH								
ROPE Diameter	Nominal weight per 100 ft in Pounds	Minimum Breaking Strength in Pounds	Vertical Hitch	Choker Hitch	Angle of Rope to Horizontal			
					90 deg	60 deg	45 deg	30 deg
Nominal in Inches	per 100 ft in Pounds	Strength in Pounds	Hitch	Hitch	Angle of Rope to Vertical			
					0 deg	30 deg	45 deg	60 deg
1/2	7.5	2,650	550	250	1,100	900	750	550
9/16	10.4	3,450	700	350	1,400	1,200	1,000	700
5/8	13.3	4,400	900	450	1,800	1,500	1,200	900
3/4	16.7	5,400	1,100	550	2,200	1,900	1,500	1,100
13/16	19.5	6,500	1,300	650	2,600	2,300	1,800	1,300
7/8	22.5	7,700	1,500	750	3,100	2,700	2,200	1,500
1	27.0	9,000	1,800	900	3,600	3,100	2,600	1,800
1 1/16	31.3	10,500	2,100	1,100	4,200	3,600	3,000	2,100
1 1/8	36.0	12,000	2,400	1,200	4,800	4,200	3,400	2,400
1 1/4	41.7	13,500	2,700	1,400	5,400	4,700	3,800	2,700
1 5/16	47.9	15,000	3,000	1,500	6,000	5,200	4,300	3,000
1 1/2	59.9	18,500	3,700	1,850	7,400	6,400	5,200	3,700
1 5/8	74.6	22,500	4,500	2,300	9,000	7,800	6,400	4,500
1 3/4	89.3	26,500	5,300	2,700	10,500	9,200	7,500	5,300
2	107.5	31,000	6,200	3,100	12,500	10,500	8,800	6,200
2 1/3	125.0	36,000	7,200	3,600	14,500	12,500	10,000	7,200
2 1/4	146.0	41,000	8,200	4,100	16,500	14,000	11,500	8,200
2 1/2	166.7	46,500	9,300	4,700	18,500	16,000	13,000	9,300
2 5/8	190.8	52,000	10,500	5,200	21,000	18,000	14,500	10,500

TABLE F-15: PART 2—Endless Sling

RATED CAPACITY IN POUNDS (Safety Factor = 5)								
ENDLESS SLING								
BASKET HITCH								
ROPE Diameter	Nominal weight per 100 ft in Pounds	Minimum Breaking Strength in Pounds	Vertical Hitch	Choker Hitch	Angle of Rope to Horizontal			
					90 deg	60 deg	45 deg	30 deg
Nominal in Inches	per 100 ft in Pounds	Strength in Pounds	Hitch	Hitch	Angle of Rope to Vertical			
					0 deg	30 deg	45 deg	60 deg
1/2	7.5	2,650	950	500	1,900	1,700	1,400	950
9/16	10.4	3,450	1,200	600	2,500	2,200	1,800	1,200
5/8	13.3	4,400	1,600	800	3,200	2,700	2,200	1,600
3/4	16.7	5,400	2,000	950	3,900	3,400	2,800	2,000
1 3/16	19.5	6,500	2,300	1,200	4,700	4,100	3,300	2,300
7/8	22.5	7,700	2,800	1,400	5,600	4,800	3,900	2,800
1	27.0	9,000	3,200	1,600	6,500	5,600	4,600	3,200

1 1/16	31.3	10,500	3,800	1,900	7,600	6,600	5,400	3,800
1 1/8	36.0	12,000	4,300	2,200	8,600	7,500	6,100	4,300
1 1/4	41.7	13,500	4,900	2,400	9,700	8,400	6,900	4,900
1 5/16	47.9	15,000	5,400	2,700	11,000	9,400	7,700	5,400
1 1/2	59.9	18,500	6,700	3,300	13,500	11,500	9,400	6,700
1 5/8	74.6	22,500	8,100	4,100	16,000	14,000	11,500	8,000
1 3/4	89.3	26,500	9,500	4,800	19,000	16,500	13,500	9,500
2	107.5	31,000	11,000	5,600	22,500	19,500	16,000	11,000
2 1/3	125.0	36,000	13,000	6,500	26,000	22,500	18,500	13,000
2 1/4	146.0	41,000	15,000	7,400	29,500	25,500	21,000	15,000
2 1/2	166.7	46,500	16,500	8,400	33,500	29,000	23,500	16,500
2 5/8	190.8	52,000	18,500	9,500	37,500	32,500	26,500	18,500

[Order 74-26, § 296-155-335 (part), Table F-15 (codified as WAC 296-155-34915), filed 5/7/74, effective 6/6/74.]

WAC 296-155-34916 Table F-16.

TABLE F-16

NYLON ROPE SLINGS

TABLE F-16: PART 1—Eye and Eye Sling

RATED CAPACITY IN POUNDS (Safety Factor = 9)								
EYE AND EYE SLING								
BASKET HITCH								
ROPE Diameter	Nominal weight per 100 ft in Pounds	Minimum Breaking Strength in Pounds	Vertical Hitch	Choker Hitch	Angle of Rope to Horizontal			
					90 deg	60 deg	45 deg	30 deg
Nominal in Inches	per 100 ft in Pounds	Strength in Pounds	Hitch	Hitch	Angle of Rope to Vertical			
					0 deg	30 deg	45 deg	60 deg
1/2	6.5	6,080	700	350	1,400	1,200	950	700
9/16	8.3	7,600	850	400	1,700	1,500	1,200	850
5/8	10.5	9,880	1,100	550	2,200	1,900	1,600	1,100
3/4	14.5	13,490	1,500	750	3,000	2,600	2,100	1,500
1 3/16	17.0	16,150	1,800	900	3,600	3,100	2,600	1,800
7/8	20.0	19,000	2,100	1,100	4,200	3,700	3,000	2,100
1	26.0	23,750	2,600	1,300	5,300	4,600	3,700	2,600
1 1/16	29.0	27,360	3,000	1,500	6,100	5,300	4,300	3,000
1 1/8	34.0	31,350	3,500	1,700	7,000	6,000	5,000	3,500
1 1/4	40.0	35,625	4,000	2,000	7,900	6,900	5,600	4,000
1 5/16	45.0	40,850	4,500	2,300	9,100	7,900	6,400	4,500
1 1/2	55.0	50,350	5,600	2,800	11,000	9,700	7,900	5,600
1 5/8	68.0	61,750	6,900	3,400	13,500	12,000	9,700	6,900
1 3/4	83.0	74,100	8,200	4,100	16,500	14,500	11,500	8,200
2	95.0	87,400	9,700	4,900	19,500	17,000	13,500	9,700
2 1/8	109.0	100,700	11,000	5,600	22,500	19,500	16,000	11,000
2 1/4	129.0	118,750	13,000	6,600	26,500	23,000	18,500	13,000
2 1/2	149.0	133,000	15,000	7,400	29,500	25,500	21,000	15,000
2 5/8	168.0	153,900	17,100	8,600	34,000	29,500	24,000	17,000

TABLE F-16: PART 2—Endless Sling

RATED CAPACITY IN POUNDS (Safety Factor = 9)								
ENDLESS SLING								
BASKET HITCH								
ROPE Diameter Nominal in Inches	Nominal weight per 100 ft in Pounds	Minimum Breaking Strength in Pounds	Vertical Hitch	Choker Hitch	Angle of Rope to Horizontal			
					90 deg	60 deg	45 deg	30 deg
1/2	6.5	6,080	1,200	600	2,400	2,100	1,700	1,200
9/16	8.3	7,600	1,500	750	3,000	2,600	2,200	1,500
5/8	10.5	9,880	2,000	1,000	4,000	3,400	2,800	2,000
3/4	14.5	13,490	2,700	1,400	5,400	4,700	3,800	2,700
1 3/16	17.0	16,150	3,200	1,600	6,400	5,600	4,600	3,200
7/8	20.0	19,000	3,800	1,900	7,600	6,600	5,400	3,800
1	26.0	23,750	4,800	2,400	9,500	8,200	6,700	4,800
1 1/16	29.0	27,360	5,500	2,700	11,000	9,500	7,700	5,500
1 1/8	34.0	31,350	6,300	3,100	12,500	11,000	8,900	6,300
1 1/4	40.0	35,625	7,100	3,600	14,500	12,500	10,000	7,100
1 5/16	45.0	40,850	8,200	4,100	16,500	14,000	12,000	8,200
1 1/2	55.0	50,350	10,000	5,000	20,000	17,500	14,000	10,000
1 5/8	68.0	61,750	12,500	6,200	24,500	21,500	17,500	12,500
1 3/4	83.0	74,100	15,000	7,400	29,500	27,500	21,000	15,000
2	95.0	87,400	17,500	8,700	35,000	30,500	24,500	17,500
2 1/8	109.0	100,700	20,000	10,000	40,500	35,000	28,500	20,000
2 1/4	129.0	118,750	24,000	12,000	47,500	41,000	33,500	24,000
2 1/2	149.0	133,000	26,500	13,500	53,000	46,000	37,500	26,500
2 5/8	168.0	153,900	31,000	15,500	61,500	53,500	43,500	31,000

[Order 74-26, § 296-155-335 (part), Table F-16 (codified as WAC 296-155-34916), filed 5/7/74, effective 6/6/74.]

WAC 296-155-34917 Table F-17.

TABLE F-17
POLYESTER ROPE SLINGS

TABLE F-17: PART 1—Eye and Eye Sling

RATED CAPACITY IN POUNDS (Safety Factor = 9)								
EYE AND EYE SLING								
BASKET HITCH								
ROPE Diameter Nominal in Inches	Nominal weight per 100 ft in Pounds	Minimum Breaking Strength in Pounds	Vertical Hitch	Choker Hitch	Angle of Rope to Horizontal			
					90 deg	60 deg	45 deg	30 deg
1/2	8.0	6,080	700	350	1,400	1,200	950	700
9/16	10.2	7,600	850	400	1,700	1,500	1,200	850
5/8	13.0	9,500	1,100	550	2,100	1,800	1,500	1,100
3/4	17.5	11,875	1,300	650	2,600	2,300	1,900	1,300
1 3/16	21.0	14,725	1,600	800	3,300	2,800	2,300	1,600
7/8	25.0	17,100	1,900	950	3,800	3,300	2,700	1,900
1	30.5	20,900	2,300	1,200	4,600	4,000	3,300	2,300
1 1/16	34.5	24,225	2,700	1,300	5,400	4,700	3,800	2,700
1 1/8	40.0	28,025	3,100	1,600	6,200	5,400	4,400	3,100

(1997 Ed.)

1 1/4	46.3	31,540	3,500	1,800	7,000	6,100	5,000	3,500
1 5/16	52.5	35,625	4,000	2,000	7,900	6,900	5,600	4,000
1 1/2	66.8	44,460	4,900	2,500	9,900	8,600	7,000	4,900
1 5/8	82.0	54,150	6,000	3,000	12,000	10,400	8,500	6,000
1 3/4	98.0	64,410	7,200	3,600	14,500	12,500	10,000	7,200
2	118.0	76,000	8,400	4,200	17,000	14,500	12,000	8,400
2 1/8	135.0	87,400	9,700	4,900	19,500	17,000	13,500	9,700
2 1/4	157.0	101,650	11,500	5,700	22,500	19,500	16,000	11,500
2 1/2	181.0	115,900	13,000	6,400	26,000	22,500	18,000	13,000
2 5/8	205.0	130,150	14,500	7,200	29,000	25,000	20,500	14,500

TABLE F-17: PART 2—Endless Sling

RATED CAPACITY IN POUNDS (Safety Factor = 9)								
ENDLESS SLING								
BASKET HITCH								
ROPE Diameter Nominal in Inches	Nominal weight per 100 ft in Pounds	Minimum Breaking Strength in Pounds	Vertical Hitch	Choker Hitch	Angle of Rope to Horizontal			
					90 deg	60 deg	45 deg	30 deg
1/2	8.0	6,080	1,200	600	2,400	2,100	1,700	1,200
9/16	10.2	7,600	1,500	750	3,000	2,600	2,200	1,500
5/8	13.0	9,500	1,900	950	3,800	3,300	2,700	1,900
3/4	17.5	11,875	2,400	1,200	4,800	4,100	3,400	2,400
1 3/16	21.0	14,725	2,900	1,500	5,900	5,100	4,200	2,900
7/8	25.0	17,100	3,400	1,700	6,800	5,900	4,800	3,400
1	30.5	20,900	4,200	2,100	8,400	7,200	5,900	4,200
1 1/16	34.5	24,225	4,800	2,400	9,700	8,400	6,900	4,800
1 1/8	40.0	28,025	5,600	2,800	11,000	9,700	7,900	5,600
1 1/4	46.3	31,540	6,300	3,200	12,500	11,000	8,900	6,300
1 5/16	52.5	35,625	7,100	3,600	14,500	12,500	10,000	7,100
1 1/2	66.8	44,460	8,900	4,400	18,000	15,500	12,500	8,900
1 5/8	82.0	54,150	11,000	5,400	21,500	19,000	15,500	11,000
1 3/4	98.0	64,410	13,000	6,400	26,000	22,500	18,000	13,000
2	118.0	76,000	15,000	7,600	30,500	26,500	21,500	15,000
2 1/8	135.0	87,400	17,500	8,700	35,000	30,500	24,500	17,500
2 1/4	157.0	101,650	20,500	10,000	40,500	35,000	29,000	20,500
2 1/2	181.0	115,900	23,000	11,500	46,500	40,000	33,000	23,000
2 5/8	205.0	130,150	26,000	13,000	52,000	45,000	37,000	26,000

[Order 74-26, § 296-155-335 (part), Table F-17 (codified as WAC 296-155-34917), filed 5/7/74, effective 6/6/74.]

WAC 296-155-34918 Table F-18.

TABLE F-18

PLOYPROPYLENE ROPE SLINGS

TABLE F-18: PART 1—Eye and Eye Sling

RATED CAPACITY IN POUNDS (Safety Factor = 6)									
EYE AND EYE SLING									
BASKET HITCH									
ROPE Dia- meter	Nominal weight per 100 ft	Minimum Break- ing Strength in Pounds	Ver- tical Hitch	Chok- er Hitch	Angle of Rope to Horizontal				
					90 deg	60 deg	45 deg	30 deg	
Nomi- nal in Inches	100 ft in Pounds	Strength in Pounds	Ver- tical Hitch	Chok- er Hitch	Angle of Rope to Vertical				
					0 deg	30 deg	45 deg	60 deg	
1/2	4.7	3,990	650	350	1,300	1,200	950	65	
9/16	6.1	4,845	800	400	1,600	1,400	1,100	800	
5/8	7.5	5,890	1,000	500	2,000	1,700	1,400	1,000	
3/4	10.7	8,075	1,300	700	2,700	2,300	1,900	1,300	
13/16	12.7	9,405	1,600	800	3,100	2,700	2,200	1,600	
7/8	15.0	10,925	1,800	900	3,600	3,200	2,600	1,800	
1	18.0	13,300	2,200	1,100	4,400	3,800	3,100	2,200	
1 1/16	20.4	15,200	2,500	1,300	5,100	4,400	3,600	2,500	
1 1/8	23.7	17,385	2,900	1,500	5,800	5,000	4,100	2,900	
1 1/4	27.0	19,950	3,300	1,700	6,700	5,800	4,700	3,300	
1 5/16	30.5	22,325	3,700	1,900	7,400	6,400	5,300	3,700	
1 1/2	38.5	28,215	4,700	2,400	9,400	8,100	6,700	4,700	
1 5/8	47.5	34,200	5,700	2,900	11,500	9,900	8,100	5,700	
1 3/4	57.0	40,850	6,800	3,400	13,500	12,000	9,600	6,800	
2	69.0	49,400	8,200	4,100	16,500	14,500	11,500	8,200	
2 1/8	80.0	57,950	9,700	4,800	19,500	16,500	13,500	9,700	
2 1/4	92.0	65,550	11,000	5,500	22,000	19,000	15,500	11,000	
2 1/2	107.0	76,000	12,500	6,300	25,500	22,000	18,000	12,500	
2 5/8	120.0	85,500	14,500	7,100	28,500	24,500	20,000	14,500	

TABLE F-18: PART 2—Endless Sling

RATED CAPACITY IN POUNDS (Safety Factor = 6)									
ENDLESS SLING									
BASKET HITCH									
ROPE Dia- meter	Nominal weight per 100 ft	Minimum Break- ing Strength in Pounds	Ver- tical Hitch	Chok- er Hitch	Angle of Rope to Horizontal				
					90 deg	60 deg	45 deg	30 deg	
Nomi- nal in Inches	100 ft in Pounds	Strength in Pounds	Ver- tical Hitch	Chok- er Hitch	Angle of Rope to Vertical				
					0 deg	30 deg	45 deg	60 deg	
1/2	4.7	3,990	1,200	600	2,400	2,100	1,700	1,200	
9/16	6.1	4,845	1,500	750	2,900	2,500	2,100	1,500	
5/8	7.5	5,890	1,800	900	3,500	3,100	2,500	1,800	
3/4	10.7	8,075	2,400	1,200	4,900	4,200	3,400	2,400	
1 3/16	12.7	9,405	2,800	1,400	5,600	4,900	4,000	2,800	
7/8	15.0	10,925	3,300	1,600	6,600	5,700	4,600	3,300	
1	18.0	13,300	4,000	2,000	8,000	6,900	5,600	4,000	
1 1/16	20.4	15,200	4,600	2,300	9,100	7,900	6,500	4,600	
1 1/8	23.7	17,385	5,200	2,600	10,500	9,000	7,400	5,200	
1 1/4	27.0	19,950	6,000	3,000	12,000	10,500	8,500	6,000	
1 5/16	30.5	22,325	6,700	3,400	13,500	11,500	9,500	6,700	
1 1/2	38.5	28,215	8,500	4,200	17,000	14,500	12,000	8,500	

1 5/8	47.5	34,200	10,500	5,100	20,500	18,000	14,500	10,500
1 3/4	57.0	40,850	12,500	6,100	24,500	21,000	17,500	12,500
2	69.0	49,400	15,000	7,400	29,500	25,500	21,000	15,000
2 1/8	80.0	57,950	17,500	8,700	35,000	30,100	24,500	17,500
2 1/4	92.0	65,550	19,500	9,900	39,500	34,000	28,000	19,500
2 1/2	107.0	76,000	23,000	11,500	45,500	39,500	32,500	23,000
2 5/8	120.0	85,500	25,500	13,000	51,500	44,500	36,500	25,500

[Order 74-26, § 296-155-335 (part), Table F-18 (codified as WAC 296-155-34918), filed 5/7/74, effective 6/6/74.]

WAC 296-155-34919 Table F-19.

TABLE F-19

SAFE WORKING LOADS FOR SHACKLES
(In tons of 2,000 pounds)

Material size (inches)	Pin diameter (inches)	Safe working load
1/2	5/8	1.4
5/8	3/4	2.2
3/4	7/8	3.2
7/8	1	4.3
1	1 1/8	5.6
1 1/8	1 1/4	6.7
1 1/4	1 3/8	8.2
1 3/8	1 1/2	10.0
1 1/2	1 15/8	11.9
1 3/4	2	16.2
2	2 1/4	21.2

[Order 74-26, § 296-155-335 (part), Table F-19 (codified as WAC 296-155-34919), filed 5/7/74, effective 6/6/74.]

WAC 296-155-34920 Table F-20.

TABLE F-20

NUMBER AND SPACING OF U-BOLT
WIRE ROPE CLIPS

Improved plow steel	Number of Clips		Minimum spacing (inches)
	Drop forged		
3/8 and under	2		3
1/2	3		3
5/8	3		3
3/4	4		4 1/2
7/8	4		5 1/4
1	5		6
1 1/8	6		7
1 1/4	6		8
1 3/8	7		9
1 1/2	7		10

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-34920, filed 7/20/94, effective 9/20/94. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-34920, filed 1/21/86; Order 74-26, § 296-155-335 (part), Table F-20 (codified as WAC 296-155-34920), filed 5/7/74, effective 6/6/74.]

**PART G
TOOLS—HAND AND POWER**

WAC 296-155-350 General requirements. (1) Condition of tools. All hand and power tools and similar equipment, whether furnished by the employer or the employee, shall be maintained in a safe condition.

(2) Guarding.

(a) When power operated tools are designed to accommodate guards, they shall be equipped with such guards when in use.

(b) Belts, gears, shafts, pulleys, sprockets, spindles, drums, fly wheels, chains, or other reciprocating, rotating or moving parts of equipment shall be guarded if such parts are exposed to contact by employees or otherwise create a hazard. Guarding shall meet the requirements as set forth in American National Standards Institute, B15.1-1953 (R1958), Safety Code for Mechanical Power-Transmission Apparatus.

(3) Personal protective equipment. Employees using hand and power tools and exposed to the hazard of falling, flying, abrasive, and splashing objects, or exposed to harmful dusts, fumes, mists, vapors, or gases shall use the particular personal protective equipment necessary to protect them from the hazard. All personal protective equipment shall meet the requirements and be maintained according to Parts B and C of this chapter.

(4) Switches.

(a) Scope. This subsection does not apply to concrete vibrators, concrete breakers, powered tampers, jack hammers, rock drills, and similar hand operated power tools.

(b) All hand-held powered platen sanders, grinders with wheels 2-inch diameter or less, routers, planers, laminate trimmers, nibblers, shears, scroll saws, and jigsaws with blade shanks one-fourth of an inch wide or less may be equipped with only a positive "on-off" control.

(c) All hand-held powered drills, tappers, fastener drivers, horizontal, vertical, and angle grinders with wheels greater than 2 inches in diameter, disc sanders, belt sanders, reciprocating saws, saber saws, and other similar operating powered tools shall be equipped with a momentary contact "on-off" control and may have a lock-on control provided that turn-off can be accomplished by a single motion of the same finger or fingers that turn it on.

(d) All other hand-held powered tools, such as circular saws, chain saws, and percussion tools, shall be equipped with a constant pressure switch that will shut off the power when the pressure is released.

(e) Disconnect switches. All fixed power driven tools shall be provided with a disconnect switch that can either be locked or tagged in the off position.

(f) Self-feed. Automatic feeding devices shall be installed on machines whenever the nature of the work will permit. Feeder attachments shall have the feed rolls or other moving parts covered or guarded so as to protect the operator from hazardous points.

[Order 74-26, § 296-155-350, filed 5/7/74, effective 6/6/74.]

WAC 296-155-355 Hand tools. (1) Employers shall not issue or permit the use of unsafe hand tools.

(2) Wrenches, including adjustable, pipe, end, and socket wrenches shall not be used when jaws are sprung or worn to the point that slippage occurs.

(3) Nails shall not be cut with an axe.

(4) Impact tools, such as drift pins, wedges, and chisels, shall be kept free of mushroomed heads.

(5) The wooden handles of tools shall be kept free of splinters or cracks and shall be kept tight in the tool.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-355, filed 1/21/86; Order 74-26, § 296-155-355, filed 5/7/74, effective 6/6/74.]

WAC 296-155-360 Power-operated hand tools. (1) Electric power-operated tools.

(a) Electric power operated tools shall either be of the approved double-insulated type or grounded in accordance with Part I of this chapter.

(b) The use of electric cords for hoisting or lowering tools shall not be permitted.

(2) Pneumatic power tools.

(a) Pneumatic power tools and hose sections shall be secured by threaded couplings, quick disconnect couplings or by 100 pound tensile strength safety chain or equivalent across each connection to prevent the tool or hose connections from becoming accidentally disconnected.

(b) Safety clips or retainers shall be securely installed and maintained on pneumatic impact (percussion) tools to prevent attachments from being accidentally expelled.

(c) All pneumatically driven nailers, staplers, and other similar equipment provided with automatic fastener feed, shall have a safety device on the muzzle to prevent the tool from ejecting fasteners, unless the muzzle is in contact with the work surface.

EXCEPTION: Pneumatic nailers or staplers utilizing "fine wire" brads or staples do not require a muzzle contact safety device, provided:

(1) The overall weight of the fastening device does not exceed the weight of standard 18 gauge wire, 1-1/2 inches long.

(2) The operator and any other person within 12 feet of the point of operation wear approved eye protection.

Note: The normal maximum diameter tolerance for manufacturing standard 18 gauge wire is .045 inches.

(d) Compressed air shall not be used at the nozzle for cleaning purposes except where reduced to less than 30 p.s.i. and then only with effective chip guarding and personal protective equipment which meets the requirements of Part C of this chapter.

Note: The above requirement does not apply to concrete form, mill scale and similar cleaning purposes. Concrete form, mill scale, and similar cleaning may be performed with air pressure exceeding 30 p.s.i. provided the nozzle and/or cleaning pipe is at least three feet long with a quick-closing (deadman) valve between the hose and the nozzle or pipe. The operator and all other employees within range of flying debris shall be protected by eye or face protection as specified in WAC 296-155-215.

(e) The manufacturer's safe operating pressure for hoses, pipes, valves, filters, and other fittings shall not be exceeded.

(f) The use of hoses for hoisting or lowering tools shall not be permitted.

(g) All hoses exceeding 1/2-inch inside diameter shall have a safety device at the source of supply or branch line to reduce pressure in case of hose failure.

(h) Airless spray guns of the type which atomize paints and fluids at high pressures (1,000 pounds or more per square inch) shall be equipped with automatic or visible manual safety devices which will prevent pulling of the trigger to prevent release of the paint or fluid until the safety device is manually released.

(i) In lieu of the above, a diffuser nut which will prevent high pressure, high velocity release, while the nozzle tip is removed, plus a nozzle tip guard which will prevent the tip from coming into contact with the operator, or other equivalent protection, shall be provided.

(j) Abrasive blast cleaning nozzles. The blast cleaning nozzles shall be equipped with an operating valve which must be held open manually. A support shall be provided on which the nozzle may be mounted when it is not in use.

(3) Fuel powered tools.

(a) All fuel powered tools shall be stopped while being refueled, serviced, or maintained, and fuel shall be transported, handled, and stored in accordance with Part D of this chapter.

(b) When fuel powered tools are used in enclosed spaces, the applicable requirements for concentrations of toxic gases and use of personal protective equipment as outlined in Parts B and C of this chapter shall apply.

(4) Hydraulic power tools.

(a) The fluid used in hydraulic powered tools shall be fire resistant fluid approved under schedule 30 of the Bureau of Mines, U.S. Department of the Interior, and shall retain its operating characteristics at the most extreme temperatures to which it will be exposed.

(b) The manufacturer's safe operating pressures for hoses, valves, pipes, filters, and other fittings shall not be exceeded.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-360, filed 7/20/94, effective 9/20/94. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-360, filed 1/21/86; Order 76-29, § 296-155-360, filed 9/30/76; Order 76-6, § 296-155-360, filed 3/1/76; Order 74-26, § 296-155-360, filed 5/7/74, effective 6/6/74.]

WAC 296-155-363 Safety requirements for powder actuated fastening systems, in accordance with ANSI A10.3-1985, Safety Requirements for Powder Actuated Fastening Systems.

[Statutory Authority: Chapter 49.17 RCW. 91-11-070 (Order 91-01), § 296-155-363, filed 5/20/91, effective 6/20/91. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-363, filed 1/21/86.]

WAC 296-155-36301 Scope. This standard provides safety requirements for a powder actuated fastening tool or machine which propels a stud, pin, fastener, or other object for the purpose of affixing it by penetration to another object.

This standard does not apply to devices designed for attaching objects to soft construction materials, such as wood, plaster, tar, dry wallboard, and the like, or to stud welding equipment.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-36301, filed 1/21/86.]

WAC 296-155-36303 Purpose. The purpose of this standard is to provide reasonable safety for life, limb, and property, by establishing requirements for design, construction, operation, service, and storage of powder actuated fastening tools, fasteners and power loads.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-36303, filed 1/21/86.]

WAC 296-155-36305 Definitions applicable to this section. (1) Angle control - a safety feature designed to prevent a tool from operating when tilted beyond a predetermined angle.

(2) Approved - meeting the requirements of this standard and acceptable to the department of labor and industries.

(3) Cased power load - a power load with the propellant contained in a closed case.

(4) Caseless power load - a power load with the propellant in solid form not requiring containment.

(5) Chamber (noun) - the location in the tool into which the power load is placed and in which it is actuated.

(6) Chamber (verb) - to fit the chamber according to manufacturer's specifications.

(7) Fasteners - any pins (unthreaded heads) or studs (threaded heads) driven by powder actuated tools.

(8) Fixture - a special shield that provides equivalent protection where the standard shield cannot be used.

(9) Head - that portion of a fastener that extends above the work surface after being properly driven.

(10) Misfire - a condition in which the power load fails to ignite after the tool has been operated.

(11) Powder actuated fastening system - a method comprising the use of a powder actuated tool, a power load, and a fastener.

(12) Powder actuated tool (also known as tool) - a tool that utilizes the expanding gases from a power load to drive a fastener.

(13) Power load - the energy source used in powder actuated tools.

(14) Qualified operator - a person who meets the requirements of WAC 296-155-36321 (1) and (2).

(15) Shield - a device, attached to the muzzle end of a tool, which is designed to confine flying particles.

(16) Spalled area - a damaged and nonuniform concrete or masonry surface.

(17) Test velocity - the measurement of fastener velocity performed in accordance with WAC 296-155-36307 (1)(m).

(18) Tools - tools can be divided into two types: Direct acting and indirect acting; and three classes: Low velocity, medium velocity, and high velocity.

(a) Direct acting tool - a tool in which the expanding gas of the power load acts directly on the fastener to be driven.

(b) Indirect acting tool - a tool in which the expanding gas of the power load acts on a captive piston, which in turn drives the fastener.

(c) Low-velocity tool - a tool whose test velocity has been measured ten times while utilizing the highest velocity combination of:

- (i) The lightest commercially available fastener designed for that specific tool;
- (ii) The strongest commercially available power load that will properly chamber in the tool;
- (iii) The piston designed for that tool and appropriate for that fastener; that will produce an average test velocity from the ten tests not in excess of 100 meters per second (328 feet per second) with no single test having a velocity of over 108 m/s (354 ft/s).

(d) Medium-velocity tool - a tool whose test velocity has been measured ten times while utilizing the highest velocity combination of:

- (i) The lightest commercially available fastener designed for the tool;
- (ii) The strongest commercially available power load that will properly chamber in the tool;
- (iii) The piston designed for that tool and appropriate for that fastener; that will produce an average test velocity from ten tests in excess of 100 m/s (328 ft/s) but not in excess of 150 m/s (492 ft/s) with no single test having a velocity of 160 m/s (525 ft/s).

(e) High-velocity tool - a tool whose test velocity has been measured ten times while utilizing the combination of:

- (i) The lightest commercially available fastener designed for the tool;
- (ii) The strongest commercially available power load which will properly chamber in the tool; that will produce an average velocity from the ten tests in excess of 150 m/s (492 ft/s).

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-36305, filed 7/20/94, effective 9/20/94. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-36305, filed 1/21/86.]

WAC 296-155-36307 Requirements. (1) General.

(a) The tool shall be designed to prevent inadvertent actuation.

(b) The tool shall be designed to prevent actuation when dropped in any attitude from a height of 3 meters (10 ft) onto a smooth, hard surface such as concrete or steel, if such actuation can propel a fastener or any part thereof in free flight.

(c) Actuation of the tool shall be dependent upon at least two separate and distinct operations by the operator, with at least one operation being separate from the operation of holding the tool against the work surface.

(d) The tool shall be designed not to be operable other than against a work surface with a force on the work surface equal to 22 newtons (5 lb) greater than the weight of the tool or a minimum impact energy of 4 joules (3 ft-lb).

(e) All tools shall be designed so that compatible protective shields or fixtures, designed, built, and supplied by the manufacturer of the tool, can be used (see WAC 296-155-36307 (2)(b), (3)(b), (4)(b) and 296-155-36313(8)).

(f) The tool shall be designed so that a determinable means of varying the power levels is available for selecting a power level adequate to perform the desired work (see WAC 296-155-36309(5)).

(g) The tool shall be designed so that all principal functional parts can be checked for foreign matter that may affect operation.

(h) The tool shall be designed so that all parts will be of adequate strength to resist maximum stresses imposed upon actuation when the tool is used in accordance with the manufacturer's instructions and is powered by any commercially available power load which will properly chamber in the tool.

(i) Each tool shall bear a legible permanent model designation, which shall serve as a means of identification. Each tool shall also bear a legible, permanent manufacturer's unique serial number.

(j) A lockable container shall be provided for each tool. The words "POWDER ACTUATED TOOL" shall appear in plain sight on the outside of the container. The following notice shall be attached on the inside cover of the container:

"WARNING - POWDER ACTUATED TOOL. TO BE USED ONLY BY A QUALIFIED OPERATOR AND KEPT UNDER LOCK AND KEY WHEN NOT IN USE."

(k) Each tool shall bear a durable warning label with the following statement, or the equivalent:

"WARNING - FOR USE ONLY BY QUALIFIED OPERATORS ACCORDING TO MANUFACTURER'S INSTRUCTION MANUAL."

(l) Each tool shall be supplied with the following:

- (i) Operator's instruction and service manual.
- (ii) Power load chart.
- (iii) Tool inspection record.
- (iv) Service tools and accessories.

(m) In determining tool test velocities, the velocity of the fastener shall be measured in free flight at a distance of 2 meters (6-1/2 ft) from the muzzle end of the tool, using accepted ballistic test methods.

(2) Design requirements - low-velocity class.

(a) Low-velocity tools, indirect-acting (piston) type, as defined in WAC 296-155-36305, shall meet the requirements of WAC 296-155-36307(1).

(b) A shield shall be supplied with each tool.

(3) Design requirements - medium-velocity class.

(a) Medium-velocity tools, indirect-acting (piston) type, as defined in WAC 296-155-36305, shall meet the requirements of WAC 296-155-36307(1).

(b) The tool shall have a shield at least 63 mm (2-1/2 in) in diameter mounted perpendicular to, and concentric with, the muzzle end, when it is indexed to the center position. A special shield or fixture may be used when it provides equivalent protection.

(c) The tool shall be designed so that it cannot be actuated unless it is equipped with a shield or fixture.

(d) The tool shall be designed with angle control so that it will not actuate when equipped with the standard shield indexed to the center position if the bearing surface of the shield is tilted more than 12 degrees from a flat surface.

(4) Design requirements - high-velocity class.

(a) High-velocity tools, direct-acting or indirect-acting type, as defined in WAC 296-155-36305, shall meet the requirements of WAC 296-155-36307(1).

(b) The tool shall have a shield at least 88 mm (3-1/2 in) in diameter mounted perpendicular to, and concentric with, the muzzle end, when it is indexed to the center

position. A special shield or fixture may be used when it provides equivalent protection.

(c) The tool shall be designed so that it cannot be actuated unless it is equipped with a shield or fixture.

(d) The tool shall be designed with angle control so that it will not actuate when equipped with the standard shield indexed to the center position, if the bearing surface of the shield is tilted more than eight degrees from a flat surface.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-36307, filed 1/21/86.]

WAC 296-155-36309 Power loads. (1) Identification of cased power loads. Cased power loads shall be coded to identify power load levels by case color and power load color as specified in Table G-1.

(2) Identification of caseless power loads. Caseless power loads shall be coded to identify power load levels by power load color as specified in Table G-1 and by configuration.

(3) Power load use limitation. No power load (cased or caseless) shall be used if it will properly chamber in any existing commercially available tool and will cause a fastener to have a test velocity in excess of the maximum test velocities specified for the said tool.

(4) Identification of power load packages. Power load packages shall provide a visual number-color indication of the power level of the power load as specified in Table G-1.

TABLE G-1
Power Load Identification

Power Level	Color Identification		Nominal velocity	
	Case Color	Load Color	Meters per Second (± 13.5)	Feet per Second (± 45)
1	Brass	Gray	91	300
2	Brass	Brown	119	390
3	Brass	Green	146	480
4	Brass	Yellow	174	570
5	Brass	Red	201	660
6	Brass	Purple	229	750
7	Nickel	Gray	256	840
8	Nickel	Brown	283	930
9	Nickel	Green	311	1020
10	Nickel	Yellow	338	1110
11	Nickel	Red	366	1200
12	Nickel	Purple	393	1290

Note: The nominal velocity applies to a 9.53 mm (3/8-in) diameter 22.7-gram (350-grain) ballistic slug fired in a test device and has no reference to actual fastener velocity developed in any specific tool.

(5) Optional power load variation. Where means other than power loads of varying power levels are to be used to control penetration, such means shall provide an equivalent power level variation.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-36309, filed 1/21/86.]

WAC 296-155-36311 Fasteners. Fasteners for use in powder actuated tools shall be designed and manufactured to function compatibly with these tools and, when used in

masonry, concrete, or steel, to effect properly the application for which they are recommended.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-36311, filed 1/21/86.]

WAC 296-155-36313 Operation. (1) Acceptable tools. Only tools meeting the requirements of this standard shall be used.

(2) Qualified operators. Only qualified operators shall operate tools.

(3) Use lowest velocity. The lowest velocity class of tool that will properly set the fastener shall be used.

(4) Operating limitations. Tools shall be operated in strict accordance with the manufacturer's instructions.

(5) Personal protection. Eye or face protection, or both, shall be worn by operators, assistants, and adjacent personnel when tool is in use. Hearing protection shall be used when making fastenings in confined areas.

(6) Daily inspections. Each day, prior to use, the operator shall inspect the tool to determine that it is in proper working condition in accordance with the testing methods recommended by the manufacture of the tool.

(7) Defective tools. Any tool found not to be in proper working condition shall be immediately removed from service and tagged "DEFECTIVE"; it shall not be used until it has been properly repaired in accordance with the manufacturer's instructions.

(8) Proper accessories. The proper shield, fixture, adapter, or accessory, suited for the application, as recommended and supplied by the manufacture, shall be used.

(9) Proper loads and fasteners. Only those types of fasteners and power loads recommended by the tool manufacture for a particular tool, or those providing the same level of safety and performance, shall be used.

(10) Questionable material. Before fastening into any questionable material, the operator shall determine its suitability by using a fastener as a center punch. If the fastener point does not easily penetrate, is not blunted, and does not fracture the material, initial test fastenings shall then be made in accordance with the tool manufacture's recommendations. (See WAC 296-155-36315(3).)

(11) Tool safety. No tool shall be loaded unless it is being prepared for immediate use. If the work is interrupted after loading, the tool shall be unloaded at once.

(12) Powder actuated magazine or clip-fed tools are not considered loaded unless a power load is actually in the ram (firing chamber), even though the magazine or clip is inserted in the tool. If work is interrupted, the firing chamber shall be cleared and the magazine or clip removed.

(13) Pointing tools. Tools shall not be loaded until just prior to the intended firing time. Neither loaded nor empty tools are to be pointed at any person; hands shall be kept clear of the open barrel end.

(14) Tool perpendicular to work. The tool shall always be held perpendicular to the work surface when fastening into any material, except for specific applications recommended by the tool manufacture.

(15) Misfires. In the event of a misfire, the operator shall hold the tool firmly against the work surface for a period of thirty seconds and then follow the explicit instructions set forth in the manufacture's instructions.

(16) Different power levels. Power loads of different power levels and types shall be kept in separate compartments or containers.

(17) Signs. A sign, at least 20 x 25 cm (8 x 10 in), using boldface type no less than 2.5 cm (1 in) in height, shall be posted in plain sight on all construction projects where tools are used. The sign shall bear wording similar to the following: "POWDER ACTUATED TOOL IN USE."

[Statutory Authority: Chapter 49.17 RCW. 91-11-070 (Order 91-01), § 296-155-36313, filed 5/20/91, effective 6/20/91; 89-11-035 (Order 89-03), § 296-155-36313, filed 5/15/89, effective 6/30/89. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-36313, filed 1/21/86.]

WAC 296-155-36315 Limitations of use. (1)

Explosive and flammable atmospheres. The tool shall not be used in an explosive or flammable atmosphere.

(2) Unattended tools prohibited. A tool shall never be left unattended in a place where it would be available to unauthorized persons.

(3) Fasteners in hard, brittle areas. Fasteners shall not be driven into very hard or brittle materials including, but not limited to, cast iron, glazed tile, hardened steel, glass block, natural rock, hollow tile, or most brick. (See WAC 296-155-36313(10).)

(4) Fasteners in soft materials. Fasteners shall not be driven into easily penetrated or thin materials, or materials of questionable resistance, unless backed by a material that will prevent the fastener from passing completely through the other side.

(5) Fasteners in steel. Fasteners shall not be driven closer than 13 mm (1/2 in) from the edge of steel except for specific applications recommended by the tool manufacturer.

(6) Fasteners in masonry. Fasteners shall not be driven closer than 7.5 cm (3 in) from the unsupported edge of masonry materials except for specific applications recommended by the tool manufacturer.

(7) Fasteners in concrete. Fasteners shall not be driven into concrete unless material thickness is at least three times the fastener shank penetration.

(8) Fasteners in spalls. Fasteners shall not be driven into any spalled area.

(9) Fasteners in existing holes. Fasteners shall not be driven through existing holes unless a specific guide means, as recommended and supplied by the tool manufacturer, is used to ensure positive alignment.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-36315, filed 1/21/86.]

WAC 296-155-36317 Maintenance and storage. (1)

Use of tools. The tool shall be serviced and inspected for worn or damaged parts at regular intervals as recommended by the tool manufacturer. Prior to the tool being put back into use, all worn or damaged parts shall be replaced by a qualified person using only parts supplied by the tool manufacturer. A record of this inspection shall be noted and dated on the tool inspection record.

(2) Instruction manuals. Instruction manuals, maintenance tools, and accessories supplied with the tool shall be stored in the tool container when not in use.

(3) Security. Powder actuated tools and power loads shall be locked in a container and stored in a safe place

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when not in use and shall be accessible only to authorized personnel.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-36317, filed 1/21/86.]

WAC 296-155-36319 Authorized instructor. (1)

Operator qualifications. Only persons trained and authorized by the tool manufacturer or by an authorized representative of the tool manufacturer shall be qualified to instruct and qualify operators for the manufacturer's powder actuated tools.

(2) Instructor qualifications. All authorized instructors shall have read and be familiar with this standard, and shall be capable of:

(a) Disassembling, servicing, and reassembling the tool.

(b) Recognizing any worn or damaged parts or defective operation.

(c) Recognizing and clearly identifying the colors used to identify power load levels.

(d) Using the tool correctly within the limitations of its use.

(e) Training and testing operators prior to issuing a qualified operator's card.

(3) Instructor's card. All authorized instructors shall have in their possession a valid authorized instructor's card issued and signed by an authorized representative of the manufacturer. The card shall be wallet size of approximately 6 x 9 cm (2-1/2 x 3-1/2 in), and the face of the card shall bear text similar to that shown in Figure G-1.

(4) List of instructors. A list of all instructors authorized by the manufacturer to instruct and qualify operators shall be maintained by the tool manufacturer and be made available to the department of labor and industries.

(5) Revocation of instructor card. Instructor's card may be revoked by the authorizing agent or the department of labor and industries, if the instructor is known to have issued a qualified operator's card in violation of any regulation contained in this standard. When an instructor is no longer authorized to issue qualified operator's cards, cards shall be surrendered to the authorizing agent or the department of labor and industries.

AUTHORIZED INSTRUCTOR

..... Powder Actuated Tools Date

(MAKE)

Card No. Social Security No.

This certifies that

(NAME OF INSTRUCTOR)

has received the prescribed training in the operation and maintenance of powder actuated tools manufactured by

..... and is qualified

(NAME OF MANUFACTURER)

to train and certify operators of

(MAKE)

powder actuated tools.

Model(s)

Authorized by

I have received instruction by the manufacturer's authorized representative in the training of operators of the above tools and agree to conform to all rules and regulations governing the instruction of tool operators.

Date of Birth

(SIGNATURE)

Figure G-1

Sample of Authorized Instructor's Card

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-36319, filed 7/20/94, effective 9/20/94. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-36319, filed 1/21/86.]

WAC 296-155-36321 Qualified operator. (1)

Operator qualifications. The operator shall be trained by an authorized instructor to be familiar with the provisions of this standard and the instructions provided by the manufacturer for operation and maintenance. The operator shall also be capable of:

- (a) Reading and understanding the manufacturer's instruction manual.
- (b) Cleaning the tool correctly.
- (c) Recognizing any worn or damaged parts or defective operation.
- (d) Recognizing the number-color code system used in this standard to identify power load levels. In the event the operator is unable to distinguish the colors used, the operator shall be given special instruction which will enable the operator to avoid error.
- (e) Using a tool correctly within the limitations of its use and demonstrate competence by operating the tool in the presence of the instructor.

(2) Operator examination. After training, the operator shall substantiate competency by completing satisfactorily a written examination provided by the manufacturer of the tool.

(a) The operator's written examination shall consist of questions to establish the operator's competence with respect to:

- (i) The requirements of this standard;
- (ii) The powder actuated fastening system; and
- (iii) The specific details of operation and maintenance of the tool(s) involved.

(b) The examination shall provide a statement, attested to by the instructor, that the applicant can (or cannot) readily distinguish the colors used to identify power load levels (see WAC 296-155-36309).

(3) Operator's card. Each applicant who meets the requirements as set forth in subsections (1) and (2) of this section shall receive a qualified operator's card, issued and signed by both the instructor and applicant. While using the tool, the operator shall carry this card.

(4) Card features. The qualified operator's card supplied by the manufacturer shall be wallet size of approximately 6 x 9 cm (2-1/2 x 3-1/2 in), and the face of the card shall bear text similar to that shown in Figure G-2.

(5) Revocation notation. There shall be printed on the card a notation reading:

"Revocation of card - Failure to comply with any of the rules and regulations for safe operation of powder actuated fastening tools shall be cause for the immediate revocation of this card."

QUALIFIED OPERATOR

..... Powder Actuated Tools Date
(MAKE)
Card No. Social Security No.

This certifies that
(NAME OF OPERATOR)
has received the prescribed training in the operation of powder actuated tools manufactured by
(NAME OF MANUFACTURER)
Model(s)
Trained and issued by
(SIGNATURE OF AUTHORIZED INSTRUCTOR)
I have received instruction in the safe operation and maintenance of powder actuated fastening tools of the makes and models specified and agree to conform to all rules and regulations governing that use
Date of Birth

Figure G-2

Sample of Qualified Operator's Card

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-36321, filed 7/20/94, effective 9/20/94. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-36321, filed 1/21/86.]

WAC 296-155-365 Abrasive wheels and tools. (1)

Power. All grinding machines shall be supplied with sufficient power to maintain the spindle speed at safe levels under all conditions of normal operation.

(2) Guarding.

(a) Grinding machines shall be equipped with safety guards in conformance with the requirements of American National Standards Institute, B7.1-1978, Safety Code for the Use, Care and Protection of Abrasive Wheels.

(b) Guard design. The safety guard shall cover the spindle end, nut, and flange projections. The safety guard shall be mounted so as to maintain proper alignment with the wheel, and the strength of the fastenings shall exceed the strength of the guard, except:

(i) Safety guards on all operations where the work provides a suitable measure of protection to the operator, may be so constructed that the spindle end, nut, and outer flange are exposed; and where the nature of the work is such as to entirely cover the side of the wheel, the side covers of the guard may be omitted; and

(ii) The spindle end, nut, and outer flange may be exposed on machines designed as portable saws.

(3) Use of abrasive wheels.

(a) Floor stand and bench mounted abrasive wheels, used for external grinding, shall be provided with safety guards (protection hoods). The maximum angular exposure of the grinding wheel periphery and sides shall be not more than 90°, except that when work requires contact with the wheel below the horizontal plane of the spindle, the angular exposure shall not exceed 125°. In either case, the exposure shall begin not more than 65° above the horizontal plane of the spindle. Safety guards shall be strong enough to withstand the effect of a bursting wheel.

(b) Floor and bench-mounted grinders shall be provided with work rests which are rigidly supported and readily adjustable. Such work rests shall be adjusted to a distance not to exceed one-eighth inch from the surface of the wheel. The work rest may be omitted when contacts of the work piece with the grinding surface below the horizontal plane of

the spindle are necessary and unavoidable, or where the size or shape of the work piece precludes use of the work rest.

(c) Cup type wheels used for external grinding shall be protected by either a revolving cup guard or a band type guard in accordance with the provisions of the American National Standards Institute, B7.1-1978, Safety Requirements for the Use, Care, and Protection of Abrasive Wheels. Abrasive wheels shall only be used on machines provided with safety guards, except the following:

(i) Wheels used for internal work while within the work being ground.

(ii) Mounted wheels, 2 inches and smaller in diameter used in portable operations.

(iii) Types 16, 17, 18, 18R and 19 cones and plugs, and threaded hole pot balls where the work offers protection or where the size does not exceed 3 inches in diameter by 5 inches in length.

(iv) Metal centered diamond lapidary wheels either notched, segmented or continuous rim used with a coolant deflector, when operated at speeds up to 3500 surface feet per minute (S.F.P.M.).

(v) Type 1 wheels not larger than 2 inches in diameter and not more than 1/2 inch thick, operating at peripheral speeds less than 1800 SFPM when mounted on mandrels driven by portable drills.

(vi) Type 1 reinforced wheels not more than 3 inches in diameter and 1/4 inch in thickness, operating at peripheral speeds not exceeding 9500 SFPM, provided that safety glasses and face shield are worn.

(vii) Valve seat grinding wheels.

(d) Portable abrasive wheels used for internal grinding shall be provided with safety flanges (protection flanges) meeting the requirements of subdivision (f) of this subsection, except as follows:

(i) When wheels 2 inches or less in diameter which are securely mounted on the end of a steel mandrel are used;

(ii) If the wheel is entirely within the work being ground while in use.

(e) When safety guards are required, they shall be so mounted as to maintain proper alignment with the wheel, and the guard and its fastenings shall be of sufficient strength to retain fragments of the wheel in case of accidental breakage.

The maximum angular exposure of the grinding wheel periphery and sides shall not exceed 180°.

(f) When safety flanges are required, they shall be used only with wheels designed to fit the flanges. Only safety flanges, of a type and design and properly assembled so as to ensure that the pieces of the wheel will be retained in case of accidental breakage, shall be used.

(g) All abrasive wheels shall be closely inspected and ring-tested before mounting to ensure that they are free from cracks or defects.

(h) Grinding wheels shall fit freely on the spindle and shall not be forced on. The spindle nut shall be tightened only enough to hold the wheel in place.

(i) All employees using abrasive wheels shall be protected by eye protection equipment in accordance with the requirements of Part C of this chapter, except when adequate eye protection is afforded by eye shields which are permanently attached to the bench or floor stand.

(4) Other requirements. All abrasive wheels and tools used by employees shall meet other applicable requirements

of American National Standards Institute, B7.1-1978, Safety Code for the Use, Care and Protection of Abrasive Wheels.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-365, filed 7/20/94, effective 9/20/94. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-365, filed 1/21/86; Order 74-26, § 296-155-365, filed 5/7/74, effective 6/6/74.]

WAC 296-155-367 Masonry saws. (1) Guarding.

(a) Masonry saws shall be guarded by semicircular enclosures over the blade.

(b) A method for retaining blade fragments shall be incorporated into the design of the semicircular enclosure.

(2) Safety latch. A safety latch shall be installed on notched saws to prevent the motor and cutting head assembly from lifting out of the notches.

(3) Blade speed. Blade speed shall be maintained in accordance with the manufacturer's specifications.

(4) Exhaust and eye protection.

(a) All table mounted masonry saws shall be equipped with a mechanical means of exhausting dust into a covered receptacle or be provided with water on the saw blade for dust control. The operator and any nearby worker shall wear appropriate eye protection in accordance with WAC 296-155-215.

(b) All portable hand-held masonry saw operators shall wear appropriate eye and respiratory protection in accordance with WAC 296-155-215 and chapter 296-62 WAC.

(5) Grounding. The motor frames of all stationary saws shall be grounded through conduit, water pipe, or a driven ground. Portable saws shall be grounded through three-pole cords attached to grounded electrical systems.

(6) Inspection. Masonry saws shall be inspected at regular intervals and maintained in safe operating condition.

[Statutory Authority: Chapter 49.17 RCW. 90-17-051 (Order 90-10), § 296-155-367, filed 8/13/90, effective 9/24/90. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-367, filed 1/21/86.]

WAC 296-155-370 Woodworking tools. (1) Speeds.

No saw shall be operated in excess of the manufacturers recommended speed.

(2) Guarding. All portable, hand held power-driven circular saws shall be equipped with guards above and below the base plate or shoe. The upper guard shall cover the saw to the depth of the teeth, except for the minimum arc required to permit the base to be tilted for bevel cuts. The lower guard shall cover the saw to the depth of the teeth, except for the minimum arc required to allow proper retraction and contact with the work. When the tool is withdrawn from the work, the lower guard shall automatically and instantly return to the covering position.

(3) Hand-fed table saws.

(a) Each circular hand-fed table saw shall be provided with a hood-type guard that will cover the blade at all times when the blade is not in use. This may be accomplished by the use of a guard that will automatically adjust to the thickness of the material being cut, or by a fixed or manually adjusted guard. If a fixed or manually adjusted guard is used, the space between the bottom of the guard and the material being cut shall not exceed 3/8 inch if 1-1/2 inches or more from the blade, and 1/4 inch if closer than 1-1/2 inches.

(b) When the blade is in use, the hood-type guard shall enclose that portion of the blade above the material.

(c) Hood-type guards shall be so designed and constructed as to resist blows and strains incidental to reasonable operation, adjusting, and handling, in order to protect the operator from flying splinters and broken saw teeth.

(d) The hood shall be so mounted as to ensure that its operation will be positive, reliable, and in alignment with the saw. The mounting shall be adequate to resist any reasonable side thrust or other force that would disrupt alignment.

(e) Where a hood-type guard cannot be used because of unusual shapes or cuts, a jig or fixture that will provide equal safety for the operator shall be used. On the completion of such operations, the guard shall be immediately replaced.

(f) A push stick shall be used on short or narrow stock when there is a possibility of the hand contacting the cutting tool.

(g) Each hand-fed circular rip saw shall be equipped with a spreader to minimize the possibility of material squeezing the saw or of material kickbacks. The spreader shall be made of tempered steel, or its equivalent, and shall be slightly thinner than the saw kerf. It shall be of sufficient width to provide adequate stiffness or rigidity to resist any reasonable side thrust or blow tending to bend or throw it out of position. The spreader shall be attached so that it will remain in true alignment with the blade, even when either the saw or table is tilted, and should be placed so that there is not more than 1/2-inch space between the spreader and the back of the blade when the recommended saw blade is in its maximum "up" position. If a blade smaller than the maximum permissible size is used, the spreader shall be moved to within 1/2 inch of the blade. The provision of a spreader in connection with grooving, dadoing, or rabbeting is not required. On the completion of such operations, the spreader shall be immediately replaced.

(h) Each hand-fed circular rip saw shall be provided with antikickback devices so located as to oppose the thrust or tendency of the saw blade to pick up the material or throw it back toward the operator. These devices shall be designed to provide holding power for all the thicknesses of material being cut.

(4) Radial saws.

(a) Hoods and guards. Each saw shall be provided with a device that will completely enclose the upper portion of the blade down to a point that includes the end of the saw arbor. The upper hood shall be so constructed as to protect the operator from flying splinters and broken saw teeth, and to deflect sawdust away from the operator. The sides of the lower exposed portion of the saw blade shall be guarded from the tips of the blade teeth inward radially with no greater than 3/8-inch gullet exposure. The device shall automatically adjust itself to the thickness of the stock and remain in contact with the stock being cut for the 90° blade positions (0° bevel) throughout the full working range of miter position. A permanent label not less than 1-1/2 inches X 3/4 inch shall be affixed to the guard visible from the normal operating position, reading as follows:

WARNING: TO AVOID INJURY, SHUT OFF POWER BEFORE CLEARING A JAMMED LOWER GUARD

Such a label shall be colored standard danger red or orange in accordance with American National Standard Safety Color Code for Marking Physical Hazards, Z53.1-1979.

(b) Spreaders. When radial saws are used for ripping, a spreader shall be provided and shall be aligned with the saw blade.

(c) Antikickback devices. Antikickback devices located on both sides of the saw blade on the outfeed side, so as to oppose the thrust or tendency of the blade to pick up the material or to throw it back toward the operator, shall be used on each radial saw used for ripping. These devices shall be designed to provide adequate holding power for all the thicknesses of material being cut.

(d) Adjustable stops and return devices. An adjustable stop shall be provided to prevent the forward travel of the blade beyond the position necessary to complete the cut. A limit chain or other equally effective device shall be provided to prevent the saw blade from sliding beyond the edge of the table; or the table shall be extended to eliminate overrun.

(e) On any manually operated saw, installation shall be such that the front of the machine is slightly higher than the rear, or some other means shall be provided so that the cutting head will not roll or move out on the arm away from the column as a result of gravity or vibration. A permanent label not less than 1-1/2 inches X 3/4 inch shall be affixed to the cutting head visible from the normal crosscut operating position, reading as follows:

WARNING: TO AVOID INJURY, RETURN CARRIAGE TO THE FULL REAR POSITION AFTER EACH CROSSCUT TYPE OF OPERATION

Such a label shall be colored standard caution yellow in accordance with American National Standard Z53.1-1979.

(f) Direction of feed. Ripping and ploughing shall be against the direction in which the saw blade turns. The direction of the saw blade rotation shall be conspicuously marked on the hoods. In addition, a permanent label not less than 1-1/2 inches X 3/4 inch shall be affixed to the end of the guard at which the blade teeth exit the upper guard during operation. The label shall be at approximately the level of the arbor and shall read as follows:

DANGER: TO AVOID INJURY, DO NOT FEED MATERIAL INTO CUTTING TOOL FROM THIS END

Such a label shall be colored standard red or orange in accordance with American National Standard, Z53.1-1979.

(5) All woodworking tools and machinery shall meet any other applicable requirements of American National Standards Institute, 01.1-1971, Safety Code for Woodworking Machinery.

(6) The control switch on all stationary radial arm saws shall be placed at the front of the saw or table and shall be properly recessed or hooded to prevent accidental contact.

(a) A firm level working area shall be provided at the front of all stationary radial arm saws. The area shall be kept free of all stumbling hazards.

(b) A push stick or similar device shall be used for pushing short material through power saws.

(7) Circular power miter saws. The requirements of subsection (4)(a) of this section applies to guarding circular power miter saws.

(8) Personal protective equipment. All personal protective equipment required for use shall conform to the requirements of Part C of this chapter.

[Statutory Authority: Chapter 49.17 RCW. 89-11-035 (Order 89-03), § 296-155-370, filed 5/15/89, effective 6/30/89. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-370, filed 1/21/86; Order 74-26, § 296-155-370, filed 5/7/74, effective 6/6/74.]

WAC 296-155-375 Jacks—Lever and ratchet, screw, and hydraulic. General requirements.

(1) The manufacturer's rated capacity shall be legibly marked on all jacks and this capacity shall not be exceeded.

(2) All jacks shall have a positive stop to prevent over-travel.

(3) Specially designed jacks constructed for specific purposes shall meet the approval of the department of labor and industries before being placed in service.

(4) Control parts shall be so designed that the operator will not be subjected to hazard.

(5) Blocking. When it is necessary to provide a firm foundation, the base of the jack shall be blocked or cribbed. Where there is a possibility of slippage of the metal cap of the jack, a wood block shall be placed between the cap and the load.

(6) Operation and maintenance.

(a) After the load has been raised, it shall immediately be cribbed, blocked, or otherwise secured.

(b) Hydraulic jacks exposed to freezing temperatures shall be supplied with an adequate antifreeze liquid.

(c) All jacks shall be properly lubricated at regular intervals. The lubricating instructions of the manufacturer should be followed, and only lubricants recommended by the manufacturer should be used.

(7) Each jack shall be thoroughly inspected at times which depend upon the service conditions. Inspections shall be not less frequent than the following:

(a) For constant or intermittent use at one locality, once every six months;

(b) For jacks sent out of shop for special work, when sent out and when returned;

(c) For a jack subjected to abnormal load or shock, immediately before and immediately thereafter.

(8) Repair or replacement parts shall be examined for possible defects.

(9) Jacks which are out of order shall be tagged accordingly, and shall not be used until repairs are made.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-375, filed 7/20/94, effective 9/20/94; 93-04-111 (Order 92-15), § 296-155-375, filed 2/3/93, effective 3/15/93; 91-11-070 (Order 91-01), § 296-155-375, filed 5/20/91, effective 6/20/91; Order 74-26, § 296-155-375, filed 5/7/74, effective 6/6/74.]

WAC 296-155-380 Air receivers. (1) Application. This section applies to compressed air receivers, and other equipment used in providing and utilizing compressed air for performing operations such as cleaning, drilling, hoisting, and chipping. On the other hand, however, this section does not deal with the special problems created by using compressed air to convey materials nor the problems created when persons work in compressed air as in tunnels and caissons. These standards are not intended to apply to compressed air machinery and equipment used on transporta-

tion vehicles such as steam railroad cars, electric railway cars, and automotive equipment.

(2) New and existing equipment.

(a) All new air receivers installed after the effective date of these standards shall be constructed in accordance with the 1968 Edition of the A.S.M.E. Boiler and Pressure Vessel Code, section VIII.

(b) All safety valves used shall be constructed, installed, and maintained in accordance with the A.S.M.E. Boiler and Pressure Vessel Code, section VIII Edition 1968.

(3) Installation. Air receivers shall be so installed that all drains, handholes, and manholes therein are easily accessible. Air receivers should be supported with sufficient clearance to permit a complete external inspection and to avoid corrosion of external surfaces. Under no circumstances shall an air receiver be buried underground or located in an inaccessible place. The receiver should be located as close to the compressor or after-cooler as is possible in order to keep the discharge pipe short.

(4) Drains and traps. All air receivers having an internal and external operating pressure exceeding 15 psi with no limitation on size, and air receivers having an inside diameter exceeding six inches, with no limitation on pressure, if subject to corrosion, shall be supplied with a drain pipe and valve at the lowest point in the vessel; or a pipe may be used extending inward from any other location to within one-quarter inch of the lowest point. Adequate automatic traps may be installed in addition to drain valves. The drain valve on the air receiver shall be opened and the receiver completely drained frequently and at such intervals as to prevent the accumulation of oil and water in the receiver.

(5) Gages and valves.

(a) Every air receiver shall be equipped with an indicating pressure gage (so located as to be readily visible) and with one or more spring-loaded safety valves. The total relieving capacity of such safety valves shall be such as to prevent pressure in the receiver from exceeding the maximum allowable working pressure of the receiver by more than ten percent.

(b) No valve of any type shall be placed between the air receiver and its safety valve or valves.

(c) Safety appliances, such as safety valves, indicating devices and controlling devices, shall be constructed, located, and installed so that they cannot be readily rendered inoperative by any means, including the elements.

(d) All safety valves shall be tested frequently and at regular intervals to determine whether they are in good operating condition.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-380, filed 7/20/94, effective 9/20/94.]

PART H WELDING AND CUTTING

WAC 296-155-400 Gas welding and cutting. (1) Transporting, moving, and storing compressed gas cylinders.

(a) Valve protection caps shall be in place and secured.

(b) When cylinders are hoisted, they shall be secured on a cradle, slingboard, or pallet. They shall not be hoisted or transported by means of magnets or choker slings.

(c) Cylinders shall be moved by tilting and rolling them on their bottom edges. They shall not be intentionally dropped, struck, or permitted to strike each other violently.

(d) When cylinders are transported by powered vehicles, they shall be secured in a vertical position.

(e) Valve protection caps shall not be used for lifting cylinders from one vertical position to another. Bars shall not be used under valves or valve protection caps to pry cylinders loose when frozen. Warm, not boiling, water shall be used to thaw cylinders loose.

(f) Unless cylinders are firmly secured on a special carrier intended for this purpose, regulators shall be removed and valve protection caps put in place before cylinders are moved.

(g) A suitable cylinder truck, chain, or other steadying device shall be used to keep cylinders from being knocked over while in use. Such cylinders are not considered to be "in storage."

(h) When a job is finished, when cylinders are empty or when cylinders are moved at any time, the cylinder valve shall be closed.

(i) Compressed gas cylinders shall be secured in an upright position at all times except, if necessary, for short periods of time while cylinders are actually being hoisted or carried.

(j) Oxygen. Oxygen cylinders in storage shall be separated from fuel-gas cylinders or combustible materials (especially oil or grease), a minimum distance of 20 feet or by a noncombustible barrier at least 5 feet high having a fire-resistance rating of at least one-half hour.

(2) Placing cylinders.

(a) Cylinders shall be kept far enough away from the actual welding or cutting operation so that sparks, hot slag, or flame will not reach them. When this is impractical, fire resistant shields shall be provided.

(b) Cylinders shall be placed where they cannot become part of an electrical circuit. Electrodes shall not be struck against a cylinder to strike an arc.

(c) Fuel gas cylinders shall be placed with valve end up whenever they are in use. They shall not be placed in a location where they would be subject to open flame, hot metal, or other sources of artificial heat.

(d) Cylinders containing oxygen or acetylene or other fuel gas shall not be taken into confined spaces.

(3) Treatment of cylinders.

(a) Cylinders, whether full or empty, shall not be used as rollers or supports.

(b) No person other than the gas supplier shall attempt to mix gases in a cylinder. No one except the owner of the cylinder or person authorized by the owner, shall refill a cylinder. No one shall use a cylinder's contents for purposes other than those intended by the supplier. All cylinders used shall meet the department of transportation requirements, Specification for Cylinders, (49 CFR Part 178, Subpart C).

(c) No damaged or defective cylinder shall be used.

(4) Use of fuel gas. The employer shall thoroughly instruct employees in the safe use of fuel gas, as follows:

(a) Before a regulator to a cylinder valve is connected, the valve shall be opened slightly and closed immediately. (This action is generally termed "cracking" and is intended to clear the valve of dust or dirt that might otherwise enter the regulator.) The person cracking the valve shall stand to

one side of the outlet, not in front of it. The valve of a fuel gas cylinder shall not be cracked where the gas would reach welding work, sparks, flame, or other possible sources of ignition.

(b) The cylinder valve shall always be opened slowly to prevent damage to the regulator. For quick closing, valves on fuel gas cylinders shall not be opened more than 1 1/2 turns. When a special wrench is required, it shall be left in position on the stem of the valve while the cylinder is in use so that the fuel gas flow can be shut off quickly in case of an emergency. In the case of manifolded or coupled cylinders, at least one such wrench shall always be available for immediate use. Nothing shall be placed on top of a fuel gas cylinder, when in use, which may damage the safety device or interfere with the quick closing of the valve.

(c) Fuel gas shall not be used from cylinders through torches or other devices which are equipped with shutoff valves without reducing the pressure through a suitable regulator attached to the cylinder valve or manifold.

(d) Before a regulator is removed from a cylinder valve, the cylinder valve shall always be closed and the gas released from the regulator.

(e) If, when the valve on a fuel gas cylinder is opened, there is found to be a leak around the valve stem, the valve shall be closed and the gland nut tightened. If this action does not stop the leak, the use of the cylinder shall be discontinued, and it shall be properly tagged and removed from the work area. In the event that fuel gas should leak from the cylinder valve, rather than from the valve stem, and the gas cannot be shut off, the cylinder shall be properly tagged and removed from the work area. If a regulator attached to a cylinder valve will effectively stop a leak through the valve seat, the cylinder need not be removed from the work area.

(f) If a leak should develop at a fuse plug or other safety device, the cylinder shall be removed from the work area.

(g) Cylinders not having fixed hand wheels shall have keys, handles, or nonadjustable wrenches on valve stems while in service. In multiple cylinder installations one and only one key or handle is required for each manifold.

(5) Fuel gas and oxygen manifolds.

(a) Fuel gas and oxygen manifolds shall bear the name of the substance they contain in letters at least 1-inch high which shall be either painted on the manifold or on a sign permanently attached to it.

(b) Fuel gas and oxygen manifolds shall be placed in safe, well ventilated, and accessible locations. They shall not be located within enclosed spaces.

(c) Manifold hose connections, including both ends of the supply hose that lead to the manifold, shall be such that the hose cannot be interchanged between fuel gas and oxygen manifolds and supply header connections. Adapters shall not be used to permit the interchange of hose. Hose connections shall be kept free of grease and oil.

(d) When not in use, manifold and header hose connections shall be capped.

(e) Nothing shall be placed on top of a manifold, when in use, which will damage the manifold or interfere with the quick closing of the valves.

(6) Hose.

(a) Fuel gas hose and oxygen hose shall be easily distinguishable from each other. The contrast may be made by different colors or by surface characteristics readily distinguishable by the sense of touch. Oxygen and fuel gas hoses shall not be interchangeable. A single hose having more than one gas passage shall not be used.

(b) When parallel sections of oxygen and fuel gas hose are taped together, not more than 4 inches out of 12 inches shall be covered by tape.

(c) All hose in use, carrying acetylene, oxygen, natural or manufactured fuel gas, or any gas or substance which may ignite or enter into combustion, or be in any way harmful to employees, shall be inspected at the beginning of each working shift. Defective hose shall be removed from service.

(d) Hose which has been subject to flashback, or which shows evidence of severe wear or damage, shall be tested to twice the normal pressure to which it is subject, but in no case less than 300 p.s.i. Defective hose, or hose in doubtful condition, shall not be used.

(e) Hose couplings shall be of the type that cannot be unlocked or disconnected by means of a straight pull without rotary motion.

(f) Boxes used for the storage of gas hose shall be ventilated.

(g) Hoses, cables, and other equipment shall be kept clear of passageways, ladders and stairs.

(7) Torches.

(a) Clogged torch tip openings shall be cleaned with suitable cleaning wires, drills, or other devices designed for such purpose.

(b) Torches in use shall be inspected at the beginning of each working shift for leaking shutoff valves, hose couplings, and tip connections. Defective torches shall not be used.

(c) Torches shall be lighted by friction lighters or other approved devices, and not by matches or from hot work.

(8) Regulators and gauges. Oxygen and fuel gas pressure regulators, including their related gauges, shall be in proper working order while in use.

(9) Oil and grease hazards. Oxygen cylinders and fittings shall be kept away from oil or grease. Cylinders, cylinder caps and valves, couplings, regulators, hose, and apparatus shall be kept free from oil or greasy substances and shall not be handled with oily hands or gloves. Oxygen shall not be directed at oily surfaces, greasy clothes, or within a fuel oil or other storage tank or vessel.

(10) Additional rules. For additional details not covered in this Part, applicable portions of American National Standards Institute, Z49.1-1973, Safety in Welding and Cutting, shall apply.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-400, filed 7/20/94, effective 9/20/94. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-400, filed 1/21/86; Order 74-26, § 296-155-400, filed 5/7/74, effective 6/6/74.]

WAC 296-155-405 Arc welding and cutting. (1) Manual electrode holders.

(a) Only manual electrode holders which are specifically designed for arc welding and cutting, and are of a capacity capable of safely handling the maximum rated current required by the electrodes, shall be used.

(b) Any current-carrying parts passing through the portion of the holder which the arc welder or cutter grips in the hand, and the outer surfaces of the jaws of the holder, shall be fully insulated against the maximum voltage encountered to ground.

(2) Welding cables and connectors.

(a) All arc welding and cutting cables shall be of the completely insulated, flexible type, capable of handling the maximum current requirements of the work in progress, taking into account the duty cycle under which the arc welder or cutter is working.

(b) Only cable free from repair or splices for a minimum distance of 10 feet from the cable end to which the electrode holder is connected shall be used, except that cables with standard insulated connectors or with splices whose insulating quality is equal to that of the cable are permitted.

(c) When it becomes necessary to connect or splice lengths of cable one to another, substantial insulated connectors of a capacity at least equivalent to that of the cable shall be used. If connections are effected by means of cable lugs, they shall be securely fastened together to give good electrical contact, and the exposed metal parts of the lugs shall be completely insulated.

(d) Cables in need of repair shall not be used. When a cable, other than the cable lead referred to in subdivision (b) of this subsection, becomes worn to the extent of exposing bare conductors, the portion thus exposed shall be protected by means of rubber and friction tape or other equivalent insulation.

(3) Ground returns and machine grounding.

(a) A ground return cable shall have a safe current carrying capacity equal to or exceeding the specified maximum output capacity of the arc welding or cutting unit which it services. When a single ground return cable services more than one unit, its safe current-carrying capacity shall equal or exceed the total specified maximum output capacities of all the units which it services.

(b) Pipelines containing gases or flammable liquids, or conduits containing electrical circuits, shall not be used as a ground return. For welding on natural gas pipelines, the technical portions of regulations issued by the Department of Transportation, Office of Pipeline Safety, Minimum Federal Safety Standards for Gas Pipelines shall apply. (49 CFR Part 192, Subpart C.)

(c) When a structure or pipeline is employed as a ground return circuit, it shall be determined that the required electrical contact exist at all joints. The generation of an arc, sparks, or heat at any point shall cause rejection of the structures as a ground circuit.

(d) When a structure or pipeline is continuously employed as a ground return circuit, all joints shall be bonded, and periodic inspections shall be conducted to ensure that no condition of electrolysis or fire hazard exists by virtue of such use.

(e) The frames of all arc welding and cutting machines shall be grounded either through a third wire in the cable containing the circuit conductor or through a separate wire which is grounded at the source of the current. Grounding circuits, other than by means of the structure, shall be checked to ensure that the circuit between the ground and the grounded power conductor has resistance low enough to

permit sufficient current to flow to cause the fuse or circuit breaker to interrupt the current.

(f) All ground connections shall be inspected to ensure that they are mechanically strong and electrically adequate for the required current.

(4) Operating instructions. Employers shall instruct employees in the safe means of arc welding and cutting as follows:

(a) When electrode holders are to be left unattended, the electrodes shall be removed and the holders shall be so placed or protected that they cannot make electrical contact with employees or conducting objects.

(b) Hot electrode holders shall not be dipped in water; to do so may expose the arc welder or cutter to electric shock.

(c) When the arc welder or cutter has occasion to leave work or to stop work for any appreciable length of time, or when the arc welding or cutting machine is to be moved, the power supply switch to the equipment shall be opened.

(d) Any faulty or defective equipment shall be reported to the supervisor.

(e) See WAC 296-155-452 for additional requirements.

(5) Shielding. Whenever practical, all arc welding and cutting operations shall be shielded by noncombustible or flameproof screens which will protect employees and other persons working in the vicinity from the direct rays of the arc.

(6) Employee protection. Where welding or cutting operations are being performed in areas where it is possible for molten slag to contact other employees, those employees shall be protected from being burned by providing overhead protection, barricading the impact area, or other effective means.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-405, filed 7/20/94, effective 9/20/94; 88-23-054 (Order 88-25), § 296-155-405, filed 11/14/88. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-405, filed 1/21/86; Order 74-26, § 296-155-405, filed 5/7/74, effective 6/6/74.]

WAC 296-155-407 Protective clothing. (1) General requirements. Employees exposed to the hazards created by welding, cutting, or brazing operations shall be protected by personal protective equipment in accordance with the requirements of chapter 296-24 WAC, Part A-2 and Part I. Appropriate protective clothing required for any welding operation will vary with the size, nature and location of the work to be performed.

(2) Specified protective clothing. Protective means which may be employed are as follows:

(a) Except when engaged in light work, all welders should wear flameproof gauntlet gloves.

(b) Flameproof aprons made of leather, or other suitable material may also be desirable as protection against radiated heat and sparks.

(c) Woolen clothing preferable to cotton because it is not so readily ignited and helps protect the welder from changes in temperature. Cotton clothing, if used, should be chemically treated to reduce its combustibility. All outer clothing such as jumpers or overalls should be reasonably free from oil or grease.

(d) Sparks may lodge in rolled-up sleeves or pockets of clothing, or cuffs of overalls or trousers. It is therefore

recommended that sleeves and collars be kept buttoned and pockets be eliminated from the front of overalls and aprons. Trousers or overalls should not be turned up on the outside.

Note: For heavy work, fire-resistant leggings, high boots, or other equivalent means should be used.

(e) In production work a sheet metal screen in front of the worker's legs can provide further protection against sparks and molten metal in cutting operations.

(f) Capes or shoulder covers made of leather or other suitable materials should be worn during overhead welding or cutting operations. Leather skull caps may be worn under helmets to prevent head burns.

(g) Where there is exposure to sharp or heavy falling objects, or a hazard of bumping in confined spaces, hard hats or head protectors shall be used.

[Statutory Authority: Chapter 49.17 RCW. 95-04-007, § 296-155-407, filed 1/18/95, effective 3/1/95. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-407, filed 1/21/86.]

WAC 296-155-410 Fire prevention. (1) When practical, objects to be welded, cut, or heated shall be moved to a designated safe location or, if the objects to be welded, cut, or heated cannot be readily moved, all movable fire hazards in the vicinity shall be taken to a safe place, or otherwise protected.

(2) If the object to be welded, cut, or heated cannot be moved and if all the fire hazards cannot be removed, positive means shall be taken to confine the heat, sparks, and slag, and to protect the immovable fire hazards from them.

(3) No welding, cutting, or heating shall be done where the application of flammable paints, or the presence of other flammable compounds, or heavy dust concentrations creates a hazard.

(4) Suitable fire extinguishing equipment shall be immediately available in the work area and shall be maintained in a state of readiness for instant use.

(5) When the welding, cutting, or heating operation is such that normal fire prevention precautions are not sufficient, additional personnel shall be assigned to guard against fire while the actual welding, cutting, or heating operation is being performed, and for a sufficient period of time after completion of the work to ensure that no possibility of fire exists. Such personnel shall be instructed as to the specific anticipated fire hazards and how the firefighting equipment provided is to be used.

(6) When welding, cutting, or heating is performed on walls, floors, and ceilings, since direct penetration of sparks or heat transfer may introduce a fire hazard to an adjacent area, the same precautions shall be taken on the opposite side as are taken on the side on which the welding is being performed.

(7) For the elimination of possible fire in enclosed spaces as a result of gas escaping through leaking or improperly closed torch valves, the gas supply to the torch shall be positively shut off at some point outside the enclosed space whenever the torch is not to be used or whenever the torch is left unattended for a substantial period of time, such as during the lunch period. Overnight and at the change of shifts, the torch and hose shall be removed from the confined space. Open end fuel gas and oxygen hoses shall be immediately removed from enclosed spaces when

they are disconnected from the torch or other gas-consuming device.

(8) Except when the contents are being removed or transferred, drums, pails, and other containers, which contain or have contained flammable liquids, shall be kept closed. Empty containers shall be removed to a safe area apart from hot work operations or open flames.

(9) Drums, containers, or hollow structures which have contained toxic or flammable substances shall, before welding, cutting, or heating is undertaken on them, either be filled with water or thoroughly cleaned of such substances and ventilated and tested. For welding, cutting and heating on steel pipelines containing natural gas, the pertinent portions of regulations issued by the Department of Transportation, Office of Pipeline Safety, Minimum Federal Safety Standards for Gas Pipelines, shall apply. (49 CFR Part 192, Subpart C.)

(10) Before heat is applied to a drum, container, or hollow structure, a vent or opening shall be provided for the release of any built-up pressure during the application of heat.

[Order 74-26, § 296-155-410, filed 5/7/74, effective 6/6/74.]

WAC 296-155-415 Ventilation and protection in welding, cutting, and heating. (1) Mechanical ventilation. For purposes of this section, mechanical ventilation shall meet the following requirements:

(a) Mechanical ventilation shall consist of either general mechanical ventilation systems or local exhaust systems.

(b) General mechanical ventilation shall be of sufficient capacity and so arranged as to produce the number of air changes necessary to maintain welding fumes and smoke within safe limits, as defined in Part B of this chapter.

(c) Local exhaust ventilation shall consist of freely movable hoods intended to be placed by the welder or burner as close as practicable to the work. This system shall be of sufficient capacity and so arranged as to remove fumes and smoke at the source and keep the concentration of them in the breathing zone within safe limits as defined in Part B of this chapter.

(d) Contaminated air exhausted from a working space shall be discharged into the open air or otherwise clear of the source of intake air.

(e) All air replacing that withdrawn shall be clean and respirable.

(f) Oxygen shall not be used for ventilation purposes, comfort cooling, blowing dust from clothing, or for cleaning the work area.

(2) Welding, cutting, and heating in confined spaces.

(a) Except as provided in subdivision (b) of this subsection and subdivision (b) of subsection (3) of this section, either general mechanical or local exhaust ventilation meeting the requirements of subsection (1) of this section shall be provided whenever welding, cutting, or heating is performed in a confined space.

(b) When sufficient ventilation cannot be obtained without blocking the means of access, employees in the confined space shall be protected by air line respirators in accordance with the requirements of Part C of this chapter, and an employee on the outside of such a confined space

shall be assigned to maintain communication with those working within it and to aid them in an emergency.

(3) Welding, cutting, or heating of metals of toxic significance.

(a) Welding, cutting, or heating in any enclosed spaces involving the metals specified in this subsection shall be performed with either general mechanical or local exhaust ventilation meeting the requirements of subsection (1) of this section:

(i) Zinc-bearing base or filler metals or metals coated with zinc-bearing materials.

(ii) Lead base metals;

(iii) Cadmium-bearing filler materials;

(iv) Chromium-bearing metals or metals coated with chromium-bearing materials.

(b) Welding, cutting, or heating in any enclosed spaces involving the metals specified in this subdivision shall be performed with local exhaust ventilation in accordance with the requirements of subsection (1) of this section, or employees shall be protected by air line respirators in accordance with the requirements of Part C of this chapter.

(i) Metals containing lead, other than as an impurity, or metals coated with lead-bearing materials;

(ii) Cadmium-bearing or cadmium-coated base metals;

(iii) Metals coated with mercury-bearing metals;

(iv) Beryllium-containing base or filler metals. Because of its high toxicity, work involving beryllium shall be done with both local exhaust ventilation and air line respirators.

(c) Employees performing such operations in the open air shall be protected by filter-type respirators in accordance with the requirements of Part C of this chapter, except that employees performing such operations on beryllium-containing base or filler metals shall be protected by air line respirators in accordance with the requirements of Part C of this chapter.

(d) Other employees exposed to the same atmosphere as the welders or burners shall be protected in the same manner as the welder or burner.

(4) Inert-gas metal-arc welding.

(a) Since the inert-gas metal-arc welding process involves the production of ultra-violet radiation of intensities of 5 to 30 times that produced during shielded metal-arc welding, the decomposition of chlorinated solvents by ultraviolet rays, and the liberation of toxic fumes and gases, employees shall not be permitted to engage in, or be exposed to the process until the following special precautions have been taken:

(i) The use of chlorinated solvents shall be kept at least 200 feet, unless shielded, from the exposed arc, and surfaces prepared with chlorinated solvents shall be thoroughly dry before welding is permitted on such surfaces.

(ii) Employees in the area not protected from the arc by screening shall be protected by filter lenses meeting the requirements of Part C of this chapter. When two or more welders are exposed to each other's arc, filter lens goggles of a suitable type, meeting the requirements of Part C of this chapter shall be worn under welding helmets. Hand shields to protect the welder against flashes and radiant energy shall be used when either the helmet is lifted or the shield is removed.

(iii) Welders and other employees who are exposed to radiation shall be suitably protected so that the skin is

covered completely to prevent burns and other damage by ultraviolet rays. Welding helmets and hand shields shall be free of leaks and openings, and free of highly reflective surfaces.

(iv) When inert-gas metal-arc welding is being performed on stainless steel, the requirements of subdivision (b) of subsection (3) of this section shall be met to protect against dangerous concentrations of nitrogen dioxide.

(5) General welding, cutting, and heating.

(a) Welding, cutting, and heating, not involving conditions or materials described in subsections (2), (3), or (4) of this section, may normally be done without mechanical ventilation or respiratory protective equipment, but where, because of unusual physical or atmospheric conditions, an unsafe accumulation of contaminants exists, suitable mechanical ventilation or respiratory protective equipment shall be provided.

(b) Employees performing any type of welding, cutting, or heating shall be protected by suitable eye protective equipment in accordance with the requirements of Part C of this chapter.

[Order 74-26, § 296-155-415, filed 5/7/74, effective 6/6/74.]

WAC 296-155-420 Welding, cutting, and heating in way of preservative coatings. (1) Before welding, cutting, or heating is commenced on any surface covered by a preservative coating whose flammability is not known, a test shall be made by a competent person to determine its flammability. Preservative coatings shall be considered to be highly flammable when scrapings burn with extreme rapidity.

(2) Precautions shall be taken to prevent ignition of highly flammable hardened preservative coatings. When coatings are determined to be highly flammable, they shall be stripped from the area to be heated to prevent ignition.

(3) Protection against toxic preservative coatings:

(a) In enclosed spaces, all surfaces covered with toxic preservatives shall be stripped of all toxic coatings for a distance of at least 4 inches from the area of heat application, or the employees shall be protected by air line respirators, meeting the requirements of Part C of this chapter.

(b) In the open air, employees shall be protected by a respirator, in accordance with requirements of Part C of this chapter.

(4) The preservative coatings shall be removed a sufficient distance from the area to be heated to ensure that the temperature of the unstripped metal will not be appreciably raised. Artificial cooling of the metal surrounding the heating area may be used to limit the size of the area required to be cleaned.

[Order 74-26, § 296-155-420, filed 5/7/74, effective 6/6/74.]

PART I ELECTRICAL

WAC 296-155-426 Introduction. This part addresses electrical safety requirements that are necessary for the practical safeguarding of employees involved in construction work and is divided into four major divisions and applicable definitions as follows:

(1) Introduction and definitions. Definitions applicable to this part are contained in WAC 296-155-462.

(2) Installation safety requirements. Installation safety requirements are contained in WAC 296-155-441 through 296-155-459. Included in this category are electric equipment and installations used to provide electric power and light on jobsites.

(3) Safety-related work practices. Safety-related work practices are contained in WAC 296-155-428 and 296-155-429. In addition to covering the hazards arising from the use of electricity at jobsites, these regulations also cover the hazards arising from the accidental contact, direct or indirect, by employees with all energized lines, above or below ground, passing through or near the jobsite.

(4) Safety-related maintenance and environmental considerations. Safety-related maintenance and environmental considerations are contained in WAC 296-155-432 and 296-155-434.

(5) Safety requirements for special equipment. Safety requirements for special equipment are contained in WAC 296-155-437.

[Statutory Authority: Chapter 49.17 RCW. 88-11-021 (Order 88-04), § 296-155-426, filed 5/11/88.]

WAC 296-155-428 General requirements. (1) Protection of employees.

(a) No employer shall permit an employee to work in such proximity to any part of an electric power circuit that the employee could contact the electric power circuit in the course of work, unless the employee is protected against electric shock by de-energizing the circuit and grounding it or by guarding it effectively by insulation or other means.

(b) No person, firm, corporation, or agent of same, shall require or permit any employee to perform any function in proximity to electrical conductors or to engage in any excavation, construction, demolition, repair, or other operation, unless and until danger from accidental contact with said electrical conductors has been effectively guarded by de-energizing the circuit and grounding it or by guarding it by effective insulation or other effective means.

(c) In work areas where the exact location of underground electric powerlines is unknown, no activity which may bring employees into contact with those powerlines shall begin until the powerlines have been positively and unmistakably de-energized and grounded.

(d) Before work is begun the employer shall ascertain by inquiry or direct observation, or by instruments, whether any part of an energized electric power circuit, exposed or concealed, is so located that the performance of the work may bring any person, tool, or machine into physical or electrical contact with the electric power circuit. The employer shall post and maintain proper warning signs where such a circuit exists. The employer shall advise employees of the location of such lines, the hazards involved, and the protective measures to be taken.

(e) No work shall be performed, no material shall be piled, stored or otherwise handled, no scaffolding, commercial signs, or structures shall be erected or dismantled, nor any tools, machinery or equipment operated within the specified minimum distances from any energized high voltage electrical conductor capable of energizing the

material or equipment; except where the electrical distribution and transmission lines have been de-energized and visibly grounded at point of work, or where insulating barriers not a part of or an attachment to the equipment have been erected, to prevent physical contact with the lines, equipment shall be operated proximate to, under, over, by, or near energized conductors only in accordance with the following:

(i) For lines rated 50 kV. or below, minimum clearance between the lines and any part of the equipment or load shall be ten feet.

(ii) For lines rated over 50 kV. minimum, clearance between the lines and any part of the equipment or load shall be ten feet plus 0.4 inch or each 1 kV. over 50 kV., or twice the length of the line insulator but never less than ten feet.

(f) Work on energized equipment. Only qualified persons shall work on electric circuit parts of equipment that have not been deenergized under the procedures of WAC 296-155-429(4). Such persons shall be capable of working safely on energized circuits and shall be familiar with the proper use of special precautionary techniques, personal protective equipment, insulating and shielding materials, and insulated tools.

(g) Overhead electric lines. Where overhead electric conductors are encountered in proximity to a work area, the employer shall be responsible for:

(i) Ascertaining the voltage and minimum clearance distance required; and

(ii) Maintaining the minimum clearance distance; and

(iii) Ensuring that the requirements of this section are complied with.

(h) If relocation of the electrical conductors is necessary, arrangements shall be made with the owners of the lines for such relocation.

(i) Barriers.

(i) Barriers shall be of such character and construction as to effectively provide the necessary protection without creating other hazards or jeopardizing the operation of the electrical circuits.

(ii) Barriers installed within the ten feet clearance from conductors shall be installed only under the supervision of authorized and qualified persons and this shall include a representative of the electrical utility or owner involved.

(j) Exceptions.

(i) These rules do not apply to the construction, reconstruction, operation, and maintenance, of overhead electrical lines, structures, and associated equipment by authorized and qualified electrical workers.

(ii) These rules do not apply to authorized and qualified employees engaged in the construction, reconstruction, operation, and maintenance, of overhead electrical circuits or conductors and associated equipment of rail transportation systems or electrical generating, transmission, distribution and communication systems which are covered by chapters 296-45 and 296-32 WAC.

(k) Special precautions must be taken.

(i) When handling any winch lines, guy wires, or other free cable, wire or rope in the vicinity of any electrical conductors.

(ii) When pulling a winch line, or other cable or rope under energized electrical conductors from a boom, mast,

pile driver, etc., in such a manner as to make possible an approach to within ten feet of a conductor.

(iii) When there is possibility of a winch line, cable, etc., either becoming disconnected or breaking under load because of excessive strain and flipping up into overhead conductors.

(iv) When placing steel, concrete reinforcement, wire mesh, etc.

(v) When handling pipe or rod sections in connection with digging wells or test holes.

(vi) When moving construction equipment, apparatus, machinery, etc., all such movements must avoid striking supporting structures, guy wires, or other elements of the electrical utility system causing the conductors to so swing or move as to decrease clearances to less than ten feet from construction equipment, or to cause them to come together.

(l) Warning sign required.

(i) An approved durable warning sign legible at twelve feet, reading "It is unlawful to operate this equipment within ten feet of electrical conductors" shall be posted and maintained in plain view of the operator at the controls of each crane, derrick, shovel, drilling rig, pile driver or similar apparatus which is capable of vertical, lateral or swinging motion.

(ii) A similar sign shall be installed on the outside of the equipment and located as to be readily visible to mechanics or other persons engaged in the work operation.

(iii) Signs shall be not less than 6" x 8" dimensions with the word "WARNING" or "DANGER" in large letters and painted red across the top and the other letters in black painted on yellow background.

(m) Any overhead wire shall be considered to be an energized line until the owner of such line or the electrical utility authorities indicate that it is not an energized line and it has been visibly grounded.

(2) Passageways and open spaces.

(a) Barriers or other means of guarding shall be provided to ensure that workspace for electrical equipment will not be used as a passageway during periods when energized parts of electrical equipment are exposed.

(b) Working spaces, walkways, and similar locations shall be kept clear of cords so as not to create a tripping hazard to employees.

(3) Load ratings. In existing installations, no changes in circuit protection shall be made to increase the load in excess of the load rating of the circuit wiring.

(4) Fuses. When fuses are installed or removed with one or both terminals energized, special tools insulated for the voltage shall be used.

(5) Cords and cables.

(a) Worn or frayed electric cords or cables shall not be used.

(b) Extension cords shall not be fastened with staples, hung from nails, or suspended by wire.

(6) Interlocks. Only a qualified person following the requirements of this section may defeat an electrical safety interlock, and then only temporarily while they are working on the equipment. The interlock systems shall be returned to its operable condition when this work is completed.

(7) Portable electric equipment—Handling. Portable equipment shall be handled in a manner which will not cause damage. Flexible electric cords connected to equipment

shall not be used for raising or lowering the equipment. Flexible cords shall not be fastened with staples or otherwise hung in such a fashion as could damage the outer jacket or insulation.

(8) Visual inspection. When an attachment plug is to be connected to a receptacle (including any on a cord set), the relationship of the plug and receptacle contacts shall first be checked to ensure they are of proper mating configurations.

(9) Connecting attachment plugs.

(a) Employees' hands shall not be wet when plugging and unplugging flexible cords and cord- and plug-connected equipment, if energized equipment is involved.

(b) Energized plug and receptacle connections shall be handled only with insulating protective equipment if the condition of the connection could provide a conducting path to the employee's hand (if, for example, a cord connector is wet from being immersed in water).

(c) Locking-type connectors shall be properly secured after connection.

(10) Routine opening and closing circuits. Load rated switches, circuit breakers, or other devices specifically designed as disconnecting means shall be used for the opening, reversing, or closing of circuits under load conditions. Cable connectors not of the load-break type, fuses, terminal lugs, and cable splice connections shall not be used for such purposes, except in an emergency.

(11) Reclosing circuits after protective device operation. After a circuit is deenergized by a circuit protective device, the circuit shall not be manually reenergized until it has been determined that the equipment and circuit can be safely energized. This repetitive manual reclosing of circuit breakers or reenergizing circuits through replaced fuses is prohibited.

Note: When it can be determined from the design of the circuit and the overcurrent devices involved that the automatic operation of a device was caused by an overload rather than a fault connection, no examination of the circuit or connected equipment is needed before the circuit is reenergized.

(12) Test instruments and equipment—Use. Only qualified persons shall perform testing work on electric circuits or equipment.

(13) Visual inspection. Test instruments and equipment and all associated test leads, cables, power cords, probes, and connectors shall be visually inspected for external defects and damage before the equipment is used. If there is a defect or evidence of damage that might expose an employee to injury, the defective or damaged item shall be removed from service, and no employee shall use it until necessary repairs and tests to render the equipment safe have been made.

(14) Rating of equipment. Test instruments and equipment and their accessories shall be rated for the circuits and equipment to which they will be connected and shall be designed for the environment in which they will be used.

(15) Occasional use of flammable or ignitable materials. Where flammable materials are present only occasionally, electric equipment capable of igniting them shall not be used, unless measures are taken to prevent hazardous conditions from developing. Such materials include, but are not limited to: Flammable gases, vapors, or liquids; combustible dust; and ignitable fibers or flyings.

(16) Work on energized equipment. Only qualified persons shall work on electric circuit parts of equipment that have not been deenergized under the procedures of WAC 296-155-429(4). Such persons shall be capable of working safely on energized circuits and shall be familiar with the proper use of special precautionary techniques, personal protective equipment, insulating and shielding materials, and insulated tools.

(17) Overhead lines. If work is to be performed near overhead lines, the lines shall be deenergized and grounded, or other protective measures shall be provided before work is started. If the lines are to be deenergized, arrangements shall be made with the person or organization that operates or controls the electric circuits involved to deenergize and ground them. If protective measures, such as guarding, isolating, or insulating, these precautions shall prevent employees from contacting such lines directly with any part of their body or indirectly through conductive materials, tools, or equipment.

(18) Unqualified persons. When an unqualified person is working in an elevated position, or on the ground, near overhead lines, the location shall be such that the person and the longest conductive object they may contact cannot come closer to any unguarded, energized overhead line than the following distances:

(a) For voltages to ground 50kV or below—10 ft.;

(b) For voltages to ground over 50kV—10 ft. plus 0.4 inch for every 1kV over 50kV.

(19) Qualified persons. When a qualified person is working in the vicinity of overhead lines, whether in an elevated position or on the ground, the person shall not approach or take any conductive object without an approved insulating handle closer to exposed energized parts that are shown in subsection (1)(e) of this section unless:

(a) The person is insulated from the energized part (gloves, with sleeves if necessary), rated for the voltage involved are considered to be insulation of the person from the energized part on which work is performed; or

(b) The energized part is insulated both from all other conductive objects at a different potential and from the person; or

(c) The person is insulated from all conductive objects at a potential different from that of the energized part.

(20) Vehicular and mechanical equipment.

(a) Any vehicle or mechanical equipment capable of having parts of its structure elevated near energized overhead lines shall be operated so that a clearance of 10 ft. is maintained. If the voltage is higher than 50kV, the clearance shall be increased 0.4 inch for every 1kV over the voltage. However, under any of the following conditions, the clearance may be reduced:

(i) If the vehicle is in transit with its structure lowered, the clearance may be reduced to 4 ft. If the voltage is higher than 50kV, the clearance shall be increased 0.4 inch for every 1kV over that voltage.

(ii) If insulating barriers are installed to prevent contact with the lines, and if the barriers are rated for the voltage of the line being guarded and are not a part of or an attachment to the vehicle or its raised structure, the clearance may be reduced to a distance within the designed working dimensions of the insulating barrier.

(b) If the equipment is an aerial lift insulated for the voltage involved, and if the work is performed by a qualified person, the clearance (between the uninsulated portion of the aerial lift and the power line) may be reduced to the distance given in (a) through (d) of this subsection.

(c) Employees standing on the ground shall not contact the vehicle or mechanical equipment or any of its attachments, unless:

(i) The employee is using protective equipment rated for the voltage; or

(ii) The equipment is located so that no uninsulated part of its structure (that portion of the structure that provides a conductive path to employees on the ground) can come closer to the line than permitted in this section.

(d) If any vehicle or mechanical equipment capable of having parts of its structure elevated near energized overhead lines is of grounding shall not stand at the grounding location whenever there is a possibility of overhead line contact. Additional precautions, such as the use of barricades or insulation, shall be taken to protect employees from hazardous ground potentials, depending on earth resistivity and fault currents, which can develop within the first few feet or more outward from the grounding point.

(21) Illumination.

(a) Employees shall not enter spaces containing exposed energized parts, unless illumination is provided that enables the employees to perform the work safely.

(b) Where lack of illumination or an obstruction precludes observation of the work to be performed, employees shall not perform tasks near exposed energized parts. Employees shall not reach blindly into areas which may contain energized parts.

(22) Confined or enclosed space (such as a manhole or vault) that contains exposed energized parts, the employer shall provide, and the employee shall use, protective shields, protective barriers, or insulating materials as necessary to avoid inadvertent contact with these parts. Doors, hinged panels, and the like shall be secured to prevent their swinging into an employee and causing the employee to contact exposed energized parts.

(23) Conductive materials and equipment. Conductive materials and equipment that are in contact with any part of an employee's body shall be handled in a manner that will prevent them from contacting exposed energized conductors or circuit parts. If an employee handle long dimensional conductive objects (such as ducts and pipes) practices (such as the use of insulation, guarding, and material handling techniques) which will minimize the hazard.

(24) Portable ladders. Portable ladders shall have nonconductive siderails if they are used where the employee or the ladder could contact exposed energized parts.

(25) Conductive apparel. Conductive articles of jewelry and clothing (such as watch bands, bracelets, rings, key chains, necklaces, metalized aprons, cloth with conductive thread, or metal headgear) shall not be worn if they might contact exposed energized parts.

(26) Housekeeping duties.

(a) Where live parts present an electrical contact hazard, employees shall not perform housekeeping duties at such close distances to the parts that there is a possibility of contact, unless adequate safeguards (such as insulating equipment or barriers) are provided.

(b) Electrically conductive cleaning materials (including conductive solids such as steel wool, metalized cloth, and silicon carbide, as well as conductive liquid solutions) shall not be used in proximity to energized parts unless procedures are followed which will prevent electrical contact.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-428, filed 7/20/94, effective 9/20/94; 92-23-017 (Order 92-13), § 296-155-428, filed 11/10/92, effective 12/18/92; 88-11-021 (Order 88-04), § 296-155-428, filed 5/11/88.]

WAC 296-155-429 Lockout and tagging of circuits.

(1) Controls. Controls that are deactivated during the course of work on energized or deenergized equipment or circuits shall be tagged and padlocked in the open position.

(2) Equipment and circuits. Equipment or circuits that are de-energized shall be rendered inoperative and have tags and locked padlocks attached at all points where such equipment or circuits can be energized.

(3) Tags. Tags shall be placed to identify plainly the equipment or circuits being worked on.

(4) Lockout and tagging. While any employee is exposed to contact with parts of fixed electric equipment or circuits which have been deenergized, the circuits energizing the parts shall be locked out or tagged or both according to the requirements of this section. The requirements shall be followed in the order in which they are presented (i.e., (a) of this subsection first, then (b) of this subsection).

Note 1: As used in this section, fixed equipment refers to equipment fastened in connected by permanent wiring methods.

Note 2: Lockout and tagging procedures that comply with chapter 296-24 WAC, Part A-4 will also be deemed to comply with this subsection provided that:

1. The procedures address the electrical safety hazards covered by this part; and
2. The procedures also incorporate the requirements of (c)(iv) and (d)(ii) of this subsection.

(a) Procedures. The employer shall maintain a written copy of the procedures outlined in this subsection and shall make it available for inspection by employees and by the director and his/her authorized representative.

Note: The written procedures may be in the form of a copy of this section, WAC 296-155-429.

(b) Deenergizing equipment.

(i) Safe procedures for deenergizing circuits and equipment shall be determined before circuits or equipment are deenergized:

(ii) The circuits and equipment to be worked on shall be disconnected from all electric energy sources. Control circuit devices, such as push buttons, selector switches, and interlocks, shall not be used as the sole means for deenergizing circuits or equipment. Interlocks for electric equipment shall not be used as a substitute for lockout and tagging procedures.

(iii) Stored electric energy which might endanger personnel shall be released. Capacitors shall be discharged and high capacitance elements shall be short-circuited and grounded, if the stored electric energy might endanger personnel.

Note: If the capacitors or associated equipment are handled in meeting this requirement, they shall be treated as energized.

(iv) Stored nonelectrical energy in devices that could reenergize electric circuit parts shall be blocked or relieved to the extent that the circuit parts could not be accidentally energized by the device.

(c) Application of locks and tags.

(i) A lock and a tag shall be placed on each disconnecting means used to deenergize circuits and equipment on which work is to be performed, except as provided in (c)(iii) and (v) of this subsection. The lock shall be attached to prevent persons from operating the disconnecting means unless they resort to undue force or the use of tools.

(ii) Each tag shall contain a statement prohibiting unauthorized operation of the disconnecting means and removal of the tag.

(iii) If a lock cannot be applied, or if the employer can demonstrate that tagging procedures will provide a level of safety equivalent to that obtained by the use of a lock, a tag may be used without a lock.

(iv) A tag used without a lock, as permitted by item (iii) of this subsection, shall be supplemented by at least one additional safety measure that provides a level of safety equivalent to that obtained by the use of a lock. Examples of additional safety measures include the removal of an isolating circuit element, blocking of a controlling switch, or opening of an extra disconnecting device.

(v) A lock may be placed without a tag only under the following conditions:

(A) Only one circuit or piece of equipment is deenergized; and

(B) The lockout period does not extend beyond the work shifts; and

(C) Employees exposed to the hazards associated with reenergizing the circuit or equipment are familiar with this procedure.

(d) Verification of deenergized condition. The requirements of this subsection shall be met before any circuits or equipment can be considered and worked as deenergized.

(i) A qualified person shall operate the equipment operating controls or otherwise verify that the equipment cannot be restarted.

(ii) A qualified person shall use test equipment to test the circuit elements and electrical parts of equipment to which employees will be exposed and shall verify that the circuit elements and equipment parts are deenergized. The test shall also determine if any energized conditions exist as a result of inadvertently induced voltage or unrelated voltage backfeed even though specific parts of the circuit have been deenergized and presumed to be safe. If the circuit to be tested is over 600 volts, nominal, the test equipment shall be checked for proper operation immediately before and immediately after this test.

(e) Reenergizing equipment. These requirements shall be met, in the order given, before circuits or equipment are reenergized, even temporarily.

(i) A qualified person shall conduct tests and visual inspections, as necessary, to verify that all tools, electrical jumpers, shorts, grounds, and other such devices have been removed, so that the circuits and equipment can be safely energized.

(ii) Employees exposed to the hazards associated with reenergizing the circuit or equipment shall be warned to stay clear of circuits and equipment.

(iii) Each lock and tag shall be removed by the employee who applied it or under his or her direct supervision. However, if this employee is absent from the work place, then the lock or tag may be removed by a qualified person designated to perform this task provided that:

(A) The employer ensures that the employee who applied the lock or tag is not available at the work place; and

(B) The employer ensures that the employee is aware that the lock or tag has been removed before he or she resumes work at that work place.

(iv) There shall be a visual determination that all employees are clear of the circuits and equipment.

[Statutory Authority: Chapter 49.17 RCW. 96-17-056, § 296-155-429, filed 8/20/96, effective 10/15/96; 94-15-096 (Order 94-07), § 296-155-429, filed 7/20/94, effective 9/20/94; 88-11-021 (Order 88-04), § 296-155-429, filed 5/11/88.]

WAC 296-155-432 Maintenance of equipment. The employer shall ensure that all wiring components and utilization equipment in hazardous locations are maintained in a dust-tight, dust-ignition-proof, or explosion-proof condition, as appropriate. There shall be no loose or missing screws, gaskets, threaded connections, seals, or other impairments to a tight condition.

[Statutory Authority: Chapter 49.17 RCW. 88-11-021 (Order 88-04), § 296-155-432, filed 5/11/88.]

WAC 296-155-434 Environmental deterioration of equipment. (1) Deteriorating agents.

(a) Unless identified for use in the operating environment, no conductors or equipment shall be located:

(i) In damp or wet locations;

(ii) Where exposed to gases, fumes, vapors, liquids, or other agents having a deteriorating effect on the conductors or equipment; or

(iii) Where exposed to excessive temperatures.

(b) Control equipment, utilization equipment, and busways approved for use in dry locations only shall be protected against damage from the weather during building construction.

(2) Protection against corrosion. Metal raceways, cable armor, boxes, cable sheathing, cabinets, elbows, couplings, fittings, supports, and support hardware shall be of materials appropriate for the environment in which they are to be installed.

[Statutory Authority: Chapter 49.17 RCW. 88-11-021 (Order 88-04), § 296-155-434, filed 5/11/88.]

WAC 296-155-437 Batteries and battery charging.

(1) General requirements.

(a) Batteries of the unsealed type shall be located in enclosures with outside vents or in well ventilated rooms and shall be arranged so as to prevent the escape of fumes, gases, or electrolyte spray into other areas.

(b) Ventilation shall be provided to ensure diffusion of the gases from the battery and to prevent the accumulation of an explosive mixture.

(c) Racks and trays shall be substantial and shall be treated to make them resistant to the electrolyte.

(d) Floors shall be of acid resistant construction unless protected from acid accumulations.

(e) Face shields, aprons, and rubber gloves shall be provided for and worn by workers handling acids or batteries.

(f) Facilities for quick drenching of the eyes and body shall be provided within 25 feet (7.62 m) of battery handling areas.

(g) Facilities shall be provided for flushing and neutralizing spilled electrolyte and for fire protection.

(2) Charging.

(a) Battery charging installations shall be located in areas designated for that purpose.

(b) Charging apparatus shall be protected from damage by trucks.

(c) When batteries are being charged, the vent caps shall be kept in place to avoid electrolyte spray. Vent caps shall be maintained in functioning condition.

[Statutory Authority: Chapter 49.17 RCW. 88-11-021 (Order 88-04), § 296-155-437, filed 5/11/88.]

WAC 296-155-441 Applicability. (1) Covered. WAC 296-155-441 through 296-155-459 contain installation safety requirements for electrical equipment and installations used to provide electric power and light at the jobsite. These sections apply to installations, both temporary and permanent, used on the jobsite; but these sections do not apply to existing permanent installations that were in place before the construction activity commenced.

Note: If the electrical installation is made in accordance with the National Electrical Code ANSI/NFPA 70-1984, exclusive of formal interpretations and tentative interim amendments, it will be deemed to be in compliance with WAC 296-155-444 through 296-155-459, except for WAC 296-155-447 (2)(a) and 296-155-449 (1)(b)(ii)(E), (F), (G), and (J).

(2) Not covered. WAC 296-155-441 through 296-155-459 do not cover installations used for the generation, transmission, and distribution of electric energy, including related communication, metering, control, and transformation installations. (However, these regulations do cover portable and vehicle-mounted generators used to provide power for equipment used at the jobsite.) See chapter 296-44 WAC, Safety standards—Electrical Construction Code, for the construction of power distribution and transmission lines.

[Statutory Authority: Chapter 49.17 RCW. 88-11-021 (Order 88-04), § 296-155-441, filed 5/11/88.]

WAC 296-155-444 General requirements. (1) Approval. All electrical conductors and equipment shall be approved.

(2) Examination, installation, and use of equipment.

(a) Examination. The employer shall ensure that electrical equipment is free from recognized hazards that are likely to cause death or serious physical harm to employees. Safety of equipment shall be determined on the basis of the following considerations:

(i) Suitability for installation and use in conformity with the provisions of this part. Suitability of equipment for an identified purpose may be evidenced by listing, labeling, or certification for that identified purpose.

(ii) Mechanical strength and durability, including, for parts designed to enclose and protect other equipment, the adequacy of the protection thus provided.

(iii) Electrical insulation.

(iv) Heating effects under conditions of use.

(v) Arcing effects.

(vi) Classification by type, size, voltage, current capacity, specific use.

(vii) Other factors which contribute to the practical safeguarding of employees using or likely to come in contact with the equipment.

(b) Installation and use. Listed, labeled, or certified equipment shall be installed and used in accordance with instructions included in the listing, labeling, or certification.

(3) Interrupting rating. Equipment intended to break current shall have an interrupting rating at system voltage sufficient for the current that must be interrupted.

(4) Mounting and cooling of equipment.

(a) Mounting. Electric equipment shall be firmly secured to the surface on which it is mounted. Wooden plugs driven into holes in masonry, concrete, plaster, or similar materials shall not be used.

(b) Cooling. Electrical equipment which depends upon the natural circulation of air and convection principles for cooling of exposed surfaces shall be installed so that room air flow over such surfaces is not prevented by walls or by adjacent installed equipment. For equipment designed for floor mounting, clearance between top surfaces and adjacent surfaces shall be provided to dissipate rising warm air. Electrical equipment provided with ventilating openings shall be installed so that walls or other obstructions do not prevent the free circulation of air through the equipment.

(5) Splices. Conductors shall be spliced or joined with splicing devices designed for the use or by brazing, welding, or soldering with a fusible metal or alloy. Soldered splices shall first be so spliced or joined as to be mechanically and electrically secure without solder and then soldered. All splices and joints and the free ends of conductors shall be covered with an insulation equivalent to that of the conductors or with an insulating device designed for the purpose.

(6) Arcing parts. Parts of electric equipment which in ordinary operation produce arcs, sparks, flames, or molten metal shall be enclosed or separated and isolated from all combustible material.

(7) Marking. Electrical equipment shall not be used unless the manufacturer's name, trademark, or other descriptive marking by which the organization responsible for the product may be identified is placed on the equipment and unless other markings are provided giving voltage, current, wattage, or other ratings as necessary. The marking shall be of sufficient durability to withstand the environment involved.

(8) Identification of disconnecting means and circuits. Each disconnecting means required by this part for motors and appliances shall be legibly marked to indicate its purpose, unless located and arranged so the purpose is evident. Each service, feeder, and branch circuit, at its disconnecting means or overcurrent device, shall be legibly marked to indicate its purpose, unless located and arranged so the purpose is evident. These markings shall be of sufficient durability to withstand the environment involved.

(9) Construction site. Precautions shall be taken to make any necessary open wiring inaccessible to unauthorized personnel.

(10) 600 volts, nominal, or less. This subsection applies to equipment operating at 600 volts, nominal, or less.

(a) Working space about electric equipment. Sufficient access and working space shall be provided and maintained about all electric equipment to permit ready and safe operation and maintenance of such equipment.

(i) Working clearances. Except as required or permitted elsewhere in this part, the dimension of the working space in the direction of access to live parts operating at 600 volts or less and likely to require examination, adjustment, servicing, or maintenance while alive shall not be less than indicated in Table I-1. In addition to the dimensions shown in Table I-1, workspace shall not be less than 30 inches (762 mm) wide in front of the electric equipment. Distances shall be measured from the live parts if they are exposed, or from the enclosure front or opening if the live parts are enclosed. Walls constructed of concrete, brick, or tile are considered to be grounded. Working space is not required in back of assemblies such as dead-front switchboards or motor control centers where there are no renewable or adjustable parts such as fuses or switches on the back and where all connections are accessible from locations other than the back.

Table I-1
Working Clearances

Nominal Voltage to Ground	Minimum Clear Distance for Conditions ¹		
	(a)	(b)	(c)
	Feet ²	Feet ²	Feet ²
0-150	3	3	3
151-600	3	3 1/2	4

¹ Conditions (a), (b), and (c) are as follows: (a) Exposed live parts on one side and no live or grounded parts on the other side of the working space, or exposed live parts on both sides effectively guarded by insulating material. Insulated wire or insulated busbars operating at not over 300 volts are not considered live parts. (b) Exposed live parts on one side and grounded parts on the other side. (c) Exposed live parts on both sides of the workspace not guarded provided in condition (a) with the operator between.

² Note: For International System of Units (SI): One foot=0.3048m.

(ii) Clear spaces. Working space required by this part shall not be used for storage. When normally enclosed live parts are exposed for inspection or servicing, the working space, if in a passageway or general open space, shall be guarded.

(iii) Access and entrance to working space. At least one entrance shall be provided to give access to the working space about electric equipment.

(iv) Front working space. Where there are live parts normally exposed on the front of switchboards or motor control centers, the working space in front of such equipment shall not be less than 3 feet (914 mm).

(v) Headroom. The minimum headroom of working spaces about service equipment, switchboards, panelboards, or motor control centers shall be 6 feet 3 inches (1.91 m).

(b) Guarding of live parts.

(i) Except as required or permitted elsewhere in this part, live parts of electric equipment operating at 50 volts or more shall be guarded against accidental contact by cabinets or other forms of enclosures, or by any of the following means:

(A) By location in a room, vault, or similar enclosure that is accessible only to qualified persons.

(B) By partitions or screens so arranged that only qualified persons will have access to the space within reach of the live parts. Any openings in such partitions or screens shall be so sized and located that persons are not likely to come into accidental contact with the live parts or to bring conducting objects into contact with them.

(C) By location on a balcony, gallery, or platform so elevated and arranged as to exclude unqualified persons.

(D) By elevation of 8 feet (2.44 m) or more above the floor or other working surface and so installed as to exclude unqualified persons.

(ii) In locations where electric equipment would be exposed to physical damage, enclosures or guards shall be so arranged and of such strength as to prevent such damage.

(iii) Entrances to rooms and other guarded locations containing exposed live parts shall be marked with conspicuous warning signs forbidding unqualified persons to enter.

(11) Over 600 volts, nominal.

(a) General. Conductors and equipment used on circuits exceeding 600 volts, nominal, shall comply with all applicable provisions of subsections (1) through (7) of this section and with the following provisions which supplement or modify those requirements. The provisions of (b), (c), and (d) of this subsection do not apply to equipment on the supply side of the service conductors.

(b) Enclosure for electrical installations. Electrical installations in a vault, room, closet or in an area surrounded by a wall, screen, or fence, access to which is controlled by lock and key or other equivalent means, are considered to be accessible to qualified persons only. A wall, screen, or fence less than 8 feet (2.44 m) in height is not considered adequate to prevent access unless it has other features that provide a degree of isolation equivalent to an 8 foot (2.44 m) fence. The entrances to all buildings, rooms or enclosures containing exposed live parts or exposed conductors operating at over 600 volts, nominal, shall be kept locked or shall be under the observation of a qualified person at all times.

(i) Installations accessible to qualified persons only. Electrical installations having exposed live parts shall be accessible to qualified persons only and shall comply with the applicable provisions of (c) of this subsection.

(ii) Installations accessible to unqualified persons. Electrical installations that are open to unqualified persons shall be made with metal-enclosed equipment or shall be enclosed in a vault or in an area, access to which is controlled by a lock. Metal-enclosed switchgear, unit substations, transformers, pull boxes, connection boxes, and other similar associated equipment shall be marked with appropriate caution signs. If equipment is exposed to physical damage from vehicular traffic, guards shall be provided to prevent such damage. Ventilating or similar openings in metal-enclosed equipment shall be designed so that foreign objects inserted through these openings will be deflected from energized parts.

(c) Workspace about equipment. Sufficient space shall be provided and maintained about electric equipment to permit ready and safe operation and maintenance of such equipment. Where energized parts are exposed, the minimum clear workspace shall not be less than 6 feet 6 inches (1.98 m) high (measured vertically from the floor or platform,) or less than 3 feet (914 mm) wide (measured parallel to the equipment.) The depth shall be as required in Table I-2. The workspace shall be adequate to permit at least a ninety degree opening of doors or hinged panels.

(i) Working space. The minimum clear working space in front of electric equipment such as switchboards, control panels, switches, circuit breakers, motor controllers, relays, and similar equipment shall not be less than specified in Table I-2 unless otherwise specified in this part. Distances shall be measured from the live parts if they are exposed, or from the enclosure front or opening if the live parts are enclosed. However, working space is not required in back of equipment such as deadfront switchboards or control assemblies where there are no renewable or adjustable parts (such as fuses or switches) on the back and where all connections are accessible from locations other than the back. Where rear access is required to work on de-energized parts on the back of enclosed equipment, a minimum working space of 30 inches (762 mm) horizontally shall be provided.

Table I-2
Minimum Depth of Clear Working
Space in Front of electric Equipment

Nominal Voltage to Ground	Minimum Clear Distance for Conditions ¹		
	(a)	(b)	(c)
	Feet ²	Feet ²	Feet ²
601 to 2,500	3	4	5
2,501 to 9,000	4	5	6
9,001 to 25,000	5	6	9
25,001 to 75kV	6	8	10
Above 75kV	8	10	12

¹ Conditions (a), (b), and (c) are as follows: (a) Exposed live parts on one side and no live or grounded parts on the other side of the working space, or exposed live parts on both sides effectively guarded by insulating materials. Insulated wire or insulated busbars operating at not over 300 volts are not considered live parts. (b) Exposed live parts on one side and grounded parts on the other side. Walls constructed of concrete, brick, or the tile are considered to be grounded surfaces. (c) Exposed live parts on both sides of the workspace (not guarded as provided in Condition (a)) with the operator between.

² Note: For S1 units: One foot=0.3048m.

(ii) Lighting outlets and points of control. The lighting outlets shall be so arranged that persons changing lamps or making repairs on the lighting system will not be endangered by live parts or other equipment. The points of control shall be so located that persons are not likely to come in contact with any live part or moving part of the equipment while turning on the lights.

(iii) Elevation of unguarded live parts. Unguarded live parts above working space shall be maintained at elevations not less than specified in Table I-3.

Table I-3
Elevation of Unguarded
Energized Parts Above Working Space

Nominal Voltage to Between Phases	Minimum Elevation
601 to 7,500	8 feet 6 inches ¹
7,501 to 35,000	9 feet
Over 35kV	9 feet + 0.37 inches per kV above 35kV

¹ Note: For S1 units: One inch=25.4mm, one foot=0.3048m.

(d) Entrance and access to workspace. At least one entrance not less than 24 inches (610 mm) wide and 6 feet 6 inches (1.98 m) high shall be provided to give access to the working space about electric equipment. On switchboard and control panels exceeding 48 inches (1.22 m) in width, there shall be one entrance at each end of such board where practicable. Where bare energized parts at any voltage or insulated energized parts above 600 volts are located adjacent to such entrance, they shall be guarded.

(12) Welding and cutting equipment. Welding and cutting equipment shall meet the requirements specified in Parts D and H of this chapter.

[Statutory Authority: Chapter 49.17 RCW. 93-19-142 (Order 93-04), § 296-155-444, filed 9/22/93, effective 11/1/93; 92-23-017 (Order 92-13), § 296-155-444, filed 11/10/92, effective 12/18/92; 88-11-021 (Order 88-04), § 296-155-444 filed 5/11/88.]

WAC 296-155-447 Wiring design and protection.

(1) Use and identification of grounded and grounding conductors.

(a) Identification of conductors. A conductor used as a grounded conductor shall be identifiable and distinguishable from all other conductors. A conductor used as an equipment grounding conductor shall be identifiable and distinguishable from all other conductors.

(b) Polarity of connections. No grounded conductor shall be attached to any terminal or lead so as to reverse designated polarity.

(c) Use of grounding terminals and devices. A grounding terminal or grounding-type device on a receptacle, cord connector, or attachment plug shall not be used for purposes other than grounding.

(2) Branch circuits.

(a) Ground-fault protection.

(i) General. The employer shall use either ground-fault circuit interrupters as specified in (a)(ii) of this subsection or an assured equipment grounding conductor program as specified in (a)(iii) of this subsection to protect employees on construction sites. These requirements are in addition to any other requirements for equipment grounding conductors.

(ii) Ground-fault circuit interrupters. All 120-volt, single-phase, 15-ampere and 20-ampere receptacle outlets on construction sites, which are not a part of the permanent wiring of the building or structure and which are in use by employees, shall have approved ground-fault circuit interrupters for personnel protection. Receptacles on a two-wire, single-phase portable or vehicle-mounted generator rated not more than 5kW, where the circuit conductors of the generator are insulated from the generator frame and all other

grounded surfaces, need not be protected with ground-fault circuit interrupters.

(iii) Assured equipment grounding conductor program. The employer shall establish and implement an assured equipment grounding conductor program on construction sites covering all cord sets, receptacles which are not a part of the building or structure, and equipment connected by cord and plug which are available for use or used by employees. This program shall comply with the following minimum requirements:

(A) A written description of the program, including the specific procedures adopted by the employer, shall be available at the jobsite for inspection and copying by the director and any affected employee.

(B) The employer shall designate one or more competent persons (as defined in WAC 296-155-012(4)) to implement the program, and to perform continuing tests and inspections as required.

(C) Each cord set, attachment cap, plug and receptacle of cord sets, and any equipment connected by cord and plug, except cord sets and receptacles which are fixed and not exposed to damage, shall be visually inspected before each day's use for external defects, such as deformed or missing pins or insulation damage, and for indications of possible internal damage. Equipment found damaged or defective shall not be used until repaired.

(D) The following tests shall be performed on all cord sets, receptacles which are not a part of the permanent wiring of the building or structure, and cord-connected and plug-connected equipment required to be grounded:

(I) All equipment grounding conductors shall be tested for continuity and shall be electrically continuous.

(II) Each receptacle and attachment cap or plug shall be tested for correct attachment of the equipment grounding conductor. The equipment grounding conductor shall be connected to its proper terminal.

(III) Each outlet receptacle, or power source shall be tested to ensure proper polarity.

(E) All required tests shall be performed:

(I) Before first use;

(II) Before equipment is returned to service following any repairs;

(III) Before equipment is used after any incident which can be reasonably suspected to have caused damage (for example, when a cord set is run over); and

(IV) At intervals not to exceed 3 months, except that cord sets and receptacles which are fixed and not exposed to damage shall be tested at intervals not exceeding 6 months.

(F) The employer shall not make available or permit the use by employees of any equipment which has not met the requirements of (a)(iii) of this subsection.

(G) Tests performed as required in this subsection shall be recorded. This test record shall identify each receptacle, cord set, and cord-connected and plug-connected equipment that passed the test and shall indicate the last date it was tested or the interval for which it was tested. This record shall be kept by means of logs, color coding, or other effective means and shall be maintained until replaced by a more current record. The record shall be made available on the jobsite for inspection by the director and any affected employee.

(b) Outlet devices. Outlet devices shall have an ampere rating not less than the load to be served and shall comply with the following:

(i) Single receptacles. A single receptacle installed on an individual branch circuit shall have an ampere rating of not less than that of the branch circuit.

(ii) Two or more receptacles. Where connected to a branch circuit supplying two or more receptacles or outlets, receptacle ratings shall conform to the values listed in Table I-4.

(iii) Receptacles used for the connection of motors. The rating of an attachment plug or receptacle used for cord-connection and plug-connection of a motor to a branch circuit shall not exceed 15 amperes at 125 volts or 10 amperes at 250 volts if individual overload protection is omitted.

Table I-4
Receptacle Ratings for Various Size Circuits

Circuit Rating Amperes	Receptacle Rating Amperes
15	Not Over 15
20	15 or 20
30	30
40	40 or 50
50	50

(3) Outside conductors and lamps.

(a) 600 volts, nominal, or less. (a)(i) through (iv)(D) of this subsection apply to branch circuit, feeder, and service conductors rated 600 volts, nominal, or less and run outdoors as open conductors.

(i) Conductors on poles. Conductors supported on poles shall provide a horizontal climbing space not less than the following:

(A) Power conductors below communication conductors: 30 inches (762 mm).

(B) Power conductors alone or above communication conductors: 300 volts or less—24 inches (610 mm); more than 300 volts—30 inches (762 mm).

(C) Communication conductors below power conductors: With power conductors 300 volts or less—24 inches (610 mm); more than 300 volts—30 inches (762 mm).

(ii) Clearance from ground. Open conductors shall conform to the following minimum clearances:

(A) 10 feet (3.05 m)—above finished grade, sidewalks, or from any platform or projection from which they might be reached.

(B) 12 feet (3.66 m)—over areas subject to vehicular traffic other than truck traffic.

(C) 15 feet (4.57 m)—over areas other than those specified in (a)(ii)(D) of this subsection that are subject to truck traffic.

(D) 18 feet (5.49 m)—over public streets, alleys, roads, and driveways.

(iii) Clearance from building openings. Conductors shall have a clearance of at least 3 feet (914 mm) from windows, doors, fire escapes, or similar locations. Conductors run above the top level of a window are considered to

be out of reach from that window and, therefore, do not have to be 3 feet (914 mm) away.

(iv) Clearance over roofs. Conductors above roof space accessible to employees on foot shall have a clearance from the highest point of the roof surface of not less than 8 feet (2.44 m) vertical clearance for insulated conductors, not less than 10 feet (3.05 m) vertical or diagonal clearance for covered conductors, and not less than 15 feet (4.57 m) for bare conductors, except that:

(A) Where the roof space is also accessible to vehicular traffic, the vertical clearance shall not be less than 18 feet (5.49 m); or

(B) Where the roof space is not normally accessible to employees on foot, fully insulated conductors shall have a vertical or diagonal clearance of not less than 3 feet (914 mm); or

(C) Where the voltage between conductors is 300 volts or less and the roof has a slope of not less than 4 inches (102 mm) in 12 inches (305 mm), the clearance from roofs shall be at least 3 feet (914 mm); or

(D) Where the voltage between conductors is 300 volts or less and the conductors do not pass over more than 4 feet (1.22 m) of the overhang portion of the roof and they are terminated at a through-the-roof raceway or support, the clearance from roofs shall be at least 18 inches (457 mm).

(b) Location of outdoor lamps. Lamps for outdoor lighting shall be located below all live conductors, transformers, or other electric equipment, unless such equipment is controlled by a disconnecting means that can be locked in the open position or unless adequate clearances or other safeguards are provided for relamping operations.

(4) Services.

(a) Disconnecting means.

(i) General. Means shall be provided to disconnect all conductors in a building or other structure from the service-entrance conductors. The disconnecting means shall plainly indicate whether it is in the open or closed position and shall be installed at a readily accessible location nearest the point of entrance of the service-entrance conductors.

(ii) Simultaneous opening of poles. Each service disconnecting means shall simultaneously disconnect all ungrounded conductors.

(b) Services over 600 volts, nominal. The following additional requirements apply to services over 600 volts, nominal.

(i) Guarding. Service-entrance conductors installed as open wires shall be guarded to make them accessible only to qualified persons.

(ii) Warning signs. Signs warning of high voltage shall be posted where unauthorized employees might come in contact with live parts.

(5) Overcurrent protection.

(a) 600 volts, nominal, or less. The following requirements apply to overcurrent protection of circuits rated 600 volts, nominal, or less.

(i) Protection of conductors and equipment. Conductors and equipment shall be protected from overcurrent in accordance with their ability to safely conduct current. Conductors shall have sufficient ampacity to carry the load.

(ii) Grounded conductors. Except for motor-running overload protection, overcurrent devices shall not interrupt

the continuity of the grounded conductor unless all conductors of the circuit are opened simultaneously.

(iii) Disconnection of fuses and thermal cutouts. Except for devices provided for current-limiting on the supply side of the service disconnecting means, all cartridge fuses which are accessible to other than qualified persons and all fuses and thermal cutouts on circuits over 150 volts to ground shall be provided with disconnecting means. This disconnecting means shall be installed so that the fuse or thermal cutout can be disconnected from its supply without disrupting service to equipment and circuits unrelated to those protected by the overcurrent device.

(iv) Location in or on premises. Overcurrent devices shall be readily accessible. Overcurrent devices shall not be located where they could create an employee safety hazard by being exposed to physical damage or located in the vicinity of easily ignitable material.

(v) Arcing or suddenly moving parts. Fuses and circuit breakers shall be so located or shielded that employees will not be burned or otherwise injured by their operation.

(vi) Circuit breakers.

(A) Circuit breakers shall clearly indicate whether they are in the open (off) or closed (on) position.

(B) Where circuit breaker handles on switchboards are operated vertically rather than horizontally or rotationally, the up position of the handle shall be the closed (on) position.

(C) If used as switches in 120-volt, fluorescent lighting circuits, circuit breakers shall be marked "SWD."

(b) Over 600 volts, nominal. Feeders and branch circuits over 600 volts, nominal, shall have short-circuit protection.

(6) Effective grounding. The path from circuits, equipment, structures, and conduit or enclosures to ground shall be permanent and continuous; have ample carrying capacity to conduct safely the currents liable to be imposed on it; and have the impedance sufficiently low to limit the potential above ground and to result in the operation of the overcurrent devices in the circuit. (a) through (k) of this subsection contain grounding requirements for systems, circuits, and equipment.

(a) Systems to be grounded. The following systems which supply premises wiring shall be grounded:

(i) Three-wire DC systems. All three-wire DC systems shall have their neutral conductor grounded.

(ii) Two-wire DC systems. Two-wire DC systems operating at over 50 volts through 300 volts between conductors shall be grounded unless they are rectifier-derived from an AC system complying with (a)(iii), (iv), and (v) of this subsection.

(iii) AC circuits, less than 50 volts. AC circuits of less than 50 volts shall be grounded if they are installed as overhead conductors outside of buildings or if they are supplied by transformers and the transformer primary supply system is ungrounded or exceeds 150 volts to ground.

(iv) AC systems, 50 volts to 1000 volts. AC systems of 50 volts to 1000 volts shall be grounded under any of the following conditions, unless exempted by (a)(v) of this subsection:

(A) If the system can be so grounded that the maximum voltage to ground on the ungrounded conductors does not exceed 150 volts;

(B) If the system is nominally rated 480Y/277 volt, 3-phase, 4-wire in which the neutral is used as a circuit conductor;

(C) If the system is nominally rated 240/120 volt, 3-phase, 4-wire in which the midpoint of one phase is used as a circuit conductor; or

(D) If a service conductor is uninsulated.

(v) Exceptions. AC systems of 50 volts to 1000 volts are not required to be grounded if the system is separately derived and is supplied by a transformer that has a primary voltage rating less than 1000 volts, provided all of the following conditions are met:

(A) The system is used exclusively for control circuits;

(B) The conditions of maintenance and supervision assure that only qualified persons will service the installation;

(C) Continuity of control power is required; and

(D) Ground detectors are installed on the control system.

(b) Separately derived systems. Where (a) of this subsection requires grounding of wiring systems whose power is derived from generator, transformer, or converter windings and has no direct electrical connection, including a solidly connected grounded circuit conductor, to supply conductors originating in another system, (e) of this subsection shall also apply.

(c) Portable and vehicle-mounted generators.

(i) Portable generators. Under the following conditions, the frame of a portable generator need not be grounded and may serve as the grounding electrode for a system supplied by the generator:

(A) The generator supplies only equipment mounted on the generator and/or cord-connected and plug-connected equipment through receptacles mounted on the generator; and

(B) The noncurrent-carrying metal parts of equipment and the equipment grounding conductor terminals of the receptacles are bonded to the generator frame.

(ii) Vehicle-mounted generators. Under the following conditions the frame of a vehicle may serve as the grounding electrode for a system supplied by a generator located on the vehicle:

(A) The frame of the generator is bonded to the vehicle frame; and

(B) The generator supplies only equipment located on the vehicle and/or cord-connected and plug-connected equipment through receptacles mounted on the vehicle or on the generator; and

(C) The noncurrent-carrying metal parts of equipment and the equipment grounding conductor terminals of the receptacles are bonded to the generator frame; and

(D) The system complies with all other provisions of this section.

(iii) Neutral conductor bonding. A neutral conductor shall be bonded to the generator frame if the generator is a component of a separately derived system. No other conductor need be bonded to the generator frame.

(d) Conductors to be grounded. For AC premises wiring systems the identified conductor shall be grounded.

(e) Grounding connections.

(i) Grounded system. For a grounded system, a grounding electrode conductor shall be used to connect both the equipment grounding conductor and the grounded circuit

conductor to the grounding electrode. Both the equipment grounding conductor and the grounding electrode conductor shall be connected to the grounded circuit conductor on the supply side of the service disconnecting means, or on the supply side of the system disconnecting means or overcurrent devices if the system is separately derived.

(ii) Ungrounded systems. For an ungrounded service-supplied system, the equipment grounding conductor shall be connected to the grounding electrode conductor at the service equipment. For an ungrounded separately derived system, the equipment grounding conductor shall be connected to the grounding electrode conductor at, or ahead of, the system disconnecting means or overcurrent devices.

(f) Grounding path. The path to ground from circuits, equipment, and enclosures shall be permanent and continuous.

(g) Supports, enclosures, and equipment to be grounded.

(i) Supports and enclosures for conductors. Metal cable trays, metal raceways, and metal enclosures for conductors shall be grounded, except that:

(A) Metal enclosures such as sleeves that are used to protect cable assemblies from physical damage need not be grounded; and

(B) Metal enclosures for conductors added to existing installations of open wire, knob-and-tube wiring, and nonmetallic-sheathed cable need not be grounded if all of the following conditions are met:

(I) Runs are less than 25 feet (7.62 m);

(II) Enclosures are free from probable contact with ground, grounded metal, metal laths, or other conductive materials; and

(III) Enclosures are guarded against employee contact.

(ii) Service equipment enclosures. Metal enclosures for service equipment shall be grounded.

(iii) Fixed equipment. Exposed noncurrent-carrying metal parts of fixed equipment which may become energized shall be grounded under any of the following conditions:

(A) If within 8 feet (2.44 m) vertically or 5 feet (1.52 m) horizontally of ground or grounded metal objects and subject to employee contact.

(B) If located in a wet or damp location and subject to employee contact.

(C) If in electrical contact with metal.

(D) If in a hazardous (classified) location.

(E) If supplied by a metal-clad, metal-sheathed, or grounded metal raceway wiring method.

(F) If equipment operates with any terminal at over 150 volts to ground; however, the following need not be grounded:

(I) Enclosures for switches or circuit breakers used for other than service equipment and accessible to qualified persons only;

(II) Metal frames of electrically heated appliances which are permanently and effectively insulated from ground; and

(III) The cases of distribution apparatus such as transformers and capacitors mounted on wooden poles at a height exceeding 8 feet (2.44 m) above ground or grade level.

(iv) Equipment connected by cord and plug. Under any of the conditions described in (g)(iv) (A) through (C) of this subsection, exposed noncurrent-carrying metal parts of cord-connected and plug-connected equipment which may become energized shall be grounded:

(A) If in a hazardous (classified) location (see WAC 296-155-444).

(B) If operated at over 150 volts to ground, except for guarded motors and metal frames of electrically heated appliances if the appliance frames are permanently and effectively insulated from ground.

(C) If the equipment is one of the types listed in (g)(iv)(C)(I) through (V) of this subsection. However, even though the equipment may be one of these types, it need not be grounded if it is exempted by (g)(iv)(C)(VI) of this subsection.

(I) Hand held motor-operated tools;

(II) Cord-connected and plug-connected equipment used in damp or wet locations or by employees standing on the ground or on metal floors or working inside of metal tanks or boilers;

(III) Portable and mobile x-ray and associated equipment;

(IV) Tools likely to be used in wet and/or conductive locations; and

(V) Portable hand lamps.

(VI) Tools likely to be used in wet and/or conductive locations need not be grounded if supplied through an isolating transformer with an ungrounded secondary of not over 50 volts. Listed or labeled portable tools and appliances protected by a system of double insulation, or its equivalent, need not be grounded. If such a system is employed, the equipment shall be distinctively marked to indicate that the tool or appliance utilizes a system of double insulation.

(v) Nonelectrical equipment. The metal parts of the following nonelectrical equipment shall be grounded: Frames and tracks of electrically operated cranes; frames of nonelectrically driven elevator cars to which electric conductors are attached; hand-operated metal shifting ropes or cables of electric elevators, and metal partitions, grill work, and similar metal enclosures around equipment of over 1kV between conductors.

(h) Methods of grounding equipment.

(i) With circuit conductors. Noncurrent-carrying metal parts of fixed equipment, if required to be grounded by this part, shall be grounded by an equipment grounding conductor which is contained within the same raceway, cable, or cord, or runs with or encloses the circuit conductors. For DC circuits only, the equipment grounding conductor may be run separately from the circuit conductors.

(ii) Grounding conductor. A conductor used for grounding fixed or movable equipment shall have capacity to conduct safely any fault current which may be imposed on it.

(iii) Equipment considered effectively grounded. Electric equipment is considered to be effectively grounded if it is secured to, and in electrical contact with, a metal rack or structure that is provided for its support and the metal rack or structure is grounded by the method specified for the noncurrent-carrying metal parts of fixed equipment in (h)(i) of this subsection. Metal car frames supported by metal hoisting cables attached to or running over metal sheaves or drums of grounded elevator machines are also considered to be effectively grounded.

(i) Bonding.

(i) If bonding conductors are used to assure electrical continuity, they shall have the capacity to conduct any fault current which may be imposed.

(ii) When attaching bonding and grounding clamps or clips, a secure and positive metal-to-metal contact shall be made. Such attachments shall be made before closures are opened and material movements are started and shall not be broken until after material movements are stopped and closures are made.

(j) Made electrodes. If made electrodes are used, they shall be free from nonconductive coatings, such as paint or enamel; and, if practicable, they shall be embedded below permanent moisture level. A single electrode consisting of a rod, pipe or plate which has a resistance to ground greater than 25 ohms shall be augmented by one additional electrode installed no closer than 6 feet (1.83 m) to the first electrode.

(k) Grounding of systems and circuits of 1000 volts and over (high voltage).

(i) General. If high voltage systems are grounded, they shall comply with all applicable provisions of (a) through (j) of this subsection as supplemented and modified by (k) of this subsection.

(ii) Grounding of systems supplying portable or mobile equipment. Systems supplying portable or mobile high voltage equipment, other than substations installed on a temporary basis, shall comply with the following:

(A) Portable and mobile high voltage equipment shall be supplied from a system having its neutral grounded through an impedance. If a delta-connected high voltage system is used to supply the equipment, a system neutral shall be derived.

(B) Exposed noncurrent-carrying metal parts of portable and mobile equipment shall be connected by an equipment grounding conductor to the point at which the system neutral impedance is grounded.

(C) Ground-fault detection and relaying shall be provided to automatically deenergize any high voltage system component which has developed a ground fault. The continuity of the equipment grounding conductor shall be continuously monitored so as to de-energize automatically the high voltage feeder to the portable equipment upon loss of continuity of the equipment grounding conductor.

(D) The grounding electrode to which the portable or mobile equipment system neutral impedance is connected shall be isolated from and separated in the ground by at least 20 feet (6.1 m) from any other system or equipment grounding electrode, and there shall be no direct connection between the grounding electrodes, such as buried pipe, fence or like objects.

(iii) Grounding of equipment. All noncurrent-carrying metal parts of portable equipment and fixed equipment including their associated fences, housings, enclosures, and supporting structures shall be grounded. However, equipment which is guarded by location and isolated from ground need not be grounded. Additionally, pole-mounted distribution apparatus at a height exceeding 8 feet (2.44 m) above ground or grade level need not be grounded.

[Statutory Authority: Chapter 49.17 RCW. 93-19-142 (Order 93-04), § 296-155-447, filed 9/22/93, effective 11/1/93; 88-11-021 (Order 88-04), § 296-155-447 filed 5/11/88.]

WAC 296-155-449 Wiring methods, components, and equipment for general use. (1) Wiring methods. The provisions of this subsection do not apply to conductors which form an integral part of equipment such as motors, controllers, motor control centers and like equipment.

(a) General requirements.

(i) Electrical continuity of metal raceways and enclosures. Metal raceways, cable armor, and other metal enclosures for conductors shall be metallically joined together into a continuous electric conductor and shall be so connected to all boxes, fittings, and cabinets as to provide effective electrical continuity.

(ii) Wiring in ducts. No wiring systems of any type shall be installed in ducts used to transport dust, loose stock or flammable vapors. No wiring system of any type shall be installed in any duct used for vapor removal or in any shaft containing only such ducts.

(iii) Receptacles for attachment plugs shall be approved, concealed contact type with a contact for extending ground continuity and shall be so designed and constructed that the plug may be pulled out without leaving any live parts exposed to accidental contact. All temporary outlet boxes shall be of a type suitable for use in wet or damp locations.

(iv) Attachment plugs or other connectors supplying equipment at more than 300 volts shall be of the skirted type or otherwise so designed that arcs will be confined.

(b) Temporary wiring.

(i) Scope. The provisions of (b) of this subsection apply to temporary electrical power and lighting wiring methods which may be of a class less than would be required for a permanent installation. Except as specifically modified in (b) of this subsection, all other requirements of this part for permanent wiring shall apply to temporary wiring installations. Temporary wiring shall be removed immediately upon completion of construction or the purpose for which the wiring was installed.

(ii) General requirements for temporary wiring.

(A) Feeders shall originate in a distribution center. The conductors shall be run as multiconductor cord or cable assemblies or within raceways; or, where not subject to physical damage, they may be run as open conductors on insulators not more than 10 feet (3.05 m) apart.

(B) Branch circuits shall originate in a power outlet or panelboard. Conductors shall be run as multiconductor cord or cable assemblies or open conductors, or shall be run in raceways. All conductors shall be protected by overcurrent devices at their ampacity. Runs of open conductors shall be located where the conductors will not be subject to physical damage, and the conductors shall be fastened at intervals not exceeding 10 feet (3.05 m). No branch-circuit conductors shall be laid on the floor. Each branch circuit that supplies receptacles or fixed equipment shall contain a separate equipment grounding conductor if the branch circuit is run as open conductors.

(C) Receptacles shall be of the grounding type. Unless installed in a complete metallic raceway, each branch circuit shall contain a separate equipment grounding conductor, and all receptacles shall be electrically connected to the grounding conductor. Receptacles for uses other than temporary lighting shall not be installed on branch circuits which supply temporary lighting. Receptacles shall not be connect-

ed to the same ungrounded conductor of multiwire circuits which supply temporary lighting.

(D) Disconnecting switches or plug connectors shall be installed to permit the disconnection of all ungrounded conductors of each temporary circuit.

(E) All lamps for general illumination shall be protected from accidental contact or breakage. Metal-case sockets shall be grounded.

(F) Temporary lights shall be equipped with hard usage (S or SJ types) electric cords with connections and insulation maintained in safe condition. "Brewery" cord (type CBO or NB) may be substituted for hard usage cord provided it is protected from physical damages. Temporary lights shall not be suspended by their electric cords unless cords and lights are designed for this means of suspension. Splices shall retain the insulation, outer sheath properties, flexibility, and usage characteristics of the cord being spliced.

When pin-type connectors or lampholders are utilized, the area of perforations caused by lampholder removal shall be restored to the insulation capabilities of the cord.

(G) Portable electric lighting used in wet and/or other conductive locations, as for example, drums, tanks, and vessels, shall be operated at 12 volts or less. However, 120-volt lights may be used if protected by a ground-fault circuit interrupter.

(H) A box shall be used wherever a change is made to a raceway system or a cable system which is metal clad or metal sheathed.

(I) Flexible cords and cables shall be protected from damage. Sharp corners and projections shall be avoided. Flexible cords and cables may pass through doorways or other pinch points, if protection is provided to avoid damage.

(J) Extension cord sets used with portable electric tools and appliances shall be of three-wire type and shall be designed for hard or extra-hard usage. Flexible cords used with temporary and portable lights shall be designed for hard or extra-hard usage.

Note: The National Electrical Code, ANSI/NFPA 70, in Article 400, Table 400-4, lists various types of flexible cords, some of which are noted as being designed for hard or extra-hard usage. Examples of these types of flexible cords include hard service cord (types S, ST, SO, STO) and junior hard service cord (types SJ, SJO, SJT, SJTO).

(iii) Guarding. For temporary wiring over 600 volts, nominal, fencing, barriers, or other effective means shall be provided to prevent access of other than authorized and qualified personnel.

(2) Cabinets, boxes, and fittings.

(a) Conductors entering boxes, cabinets, or fittings. Conductors entering boxes, cabinets, or fittings shall be protected from abrasion, and openings through which conductors enter shall be effectively closed. Unused openings in cabinets, boxes, and fittings shall also be effectively closed.

(b) Covers and canopies. All pull boxes, junction boxes, and fittings shall be provided with covers. If metal covers are used, they shall be grounded. In energized installations each outlet box shall have a cover, faceplate, or fixture canopy. Covers of outlet boxes having holes through which flexible cord pendants pass shall be provided with bushings designed for the purpose or shall have smooth, well-rounded surfaces on which the cords may bear.

(c) Pull and junction boxes for systems over 600 volts, nominal. In addition to other requirements in this section for pull and junction boxes, the following shall apply to these boxes for systems over 600 volts, nominal:

(i) Complete enclosure. Boxes shall provide a complete enclosure for the contained conductors or cables.

(ii) Covers. Boxes shall be closed by covers securely fastened in place. Underground box covers that weigh over 100 pounds (43.6 kg) meet this requirement. Covers for boxes shall be permanently marked "HIGH VOLTAGE." The marking shall be on the outside of the box cover and shall be readily visible and legible.

(3) Knife switches. Single-throw knife switches shall be so connected that the blades are dead when the switch is in the open position. Single-throw knife switches shall be so placed that gravity will not tend to close them. Single-throw knife switches approved for use in the inverted position shall be provided with a locking device that will ensure that the blades remain in the open position when so set. Double-throw knife switches may be mounted so that the throw will be either vertical or horizontal. However, if the throw is vertical, a locking device shall be provided to ensure that the blades remain in the open position when so set.

(4) Switchboards and panelboards. Switchboards that have any exposed live parts shall be located in permanently dry locations and accessible only to qualified persons. Panelboards shall be mounted in cabinets, cutout boxes, or enclosures designed for the purpose and shall be dead front. However, panelboards other than the dead front externally-operable type are permitted where accessible only to qualified persons. Exposed blades of knife switches shall be dead when open.

(5) Enclosures for damp or wet locations.

(a) Cabinets, fittings, and boxes. Cabinets, cutout boxes, fittings, boxes, and panelboard enclosures in damp or wet locations shall be installed so as to prevent moisture or water from entering and accumulating within the enclosures. In wet locations the enclosures shall be weatherproof.

(b) Switches and circuit breakers. Switches, circuit breakers, and switchboards installed in wet locations shall be enclosed in weatherproof enclosures.

(6) Conductors for general wiring. All conductors used for general wiring shall be insulated unless otherwise permitted in this part. The conductor insulation shall be of a type that is suitable for the voltage, operating temperature, and location of use. Insulated conductors shall be distinguishable by appropriate color or other means as being grounded conductors, ungrounded conductors, or equipment grounding conductors.

(7) Flexible cords and cables.

(a) Use of flexible cords and cables.

(i) Permitted uses. Flexible cords and cables shall be suitable for conditions of use and location. Flexible cords and cables shall be used only for:

(A) Pendants;

(B) Wiring of fixtures;

(C) Connection of portable lamps or appliances;

(D) Elevator cables;

(E) Wiring of cranes and hoists;

(F) Connection of stationary equipment to facilitate their frequent interchange;

(G) Prevention of the transmission of noise or vibration; or

(H) Appliances where the fastening means and mechanical connections are designed to permit removal for maintenance and repair.

(ii) Attachment plugs for cords. If used as permitted in (a)(i)(C), (F), or (H) of this subsection, the flexible cord shall be equipped with an attachment plug and shall be energized from a receptacle outlet.

(iii) Prohibited uses. Unless necessary for a use permitted in (a)(i) of this subsection, flexible cords and cables shall not be used:

(A) As a substitute for the fixed wiring of a structure;

(B) Where run through holes in walls, ceilings, or floors;

(C) Where run through doorways, windows, or similar openings, except as permitted in subsection (1)(b)(ii)(I) of this section;

(D) Where attached to building surfaces; or

(E) Where concealed behind building walls, ceilings, or floors.

(b) Identification, splices, and terminations.

(i) Identification. A conductor of a flexible cord or cable that is used as a grounded conductor or an equipment grounding conductor shall be distinguishable from other conductors.

(ii) Marking. Type SJ, SJO, SJT, SJTO, S, SO, ST, and STO cords shall not be used unless durably marked on the surface with the type designation, size, and number of conductors.

(iii) Splices. Flexible cords shall be used only in continuous lengths without splice or tap. Hard service flexible cords No. 12 or larger may be repaired if spliced so that the splice retains the insulation, outer sheath properties, and usage characteristics of the cord being spliced.

(iv) Strain relief. Flexible cords shall be connected to devices and fittings so that strain relief is provided which will prevent pull from being directly transmitted to joints or terminal screws.

(v) Cords passing through holes. Flexible cords and cables shall be protected by bushings or fittings where passing through holes in covers, outlet boxes, or similar enclosures.

(vi) Trailing cables shall be protected from damage.

(vii) Cord and cable passing through work areas shall be covered or elevated to protect it from damage which would create a hazard to employees.

(8) Portable cables over 600 volts, nominal. Multiconductor portable cable for use in supplying power to portable or mobile equipment at over 600 volts, nominal, shall consist of No. 8 or larger conductors employing flexible stranding. Cables operated at over 2000 volts shall be shielded for the purpose of confining the voltage stresses to the insulation. Grounding conductors shall be provided. Connectors for these cables shall be of a locking type with provisions to prevent their opening or closing while energized. Strain relief shall be provided at connections and terminations. Portable cables shall not be operated with splices unless the splices are of the permanent molded, vulcanized, or other equivalent type. Termination enclosures shall be marked with a high voltage hazard warning, and terminations shall be accessible only to authorized and qualified personnel.

(9) Fixture wires.

(a) General. Fixture wires shall be suitable for the voltage, temperature, and location of use. A fixture wire which is used as a grounded conductor shall be identified.

(b) Uses permitted. Fixture wires may be used:

(i) For installation in lighting, fixtures and in similar equipment where enclosed or protected and not subject to bending or twisting in use; or

(ii) For connecting lighting fixtures to the branch-circuit conductors supplying the fixtures.

(c) Uses not permitted. Fixture wires shall not be used as branch-circuit conductors except as permitted for Class 1 power-limited circuits.

(10) Equipment for general use.

(a) Lighting fixtures, lampholders, lamps, and receptacles.

(i) Live parts. Fixtures, lampholders, lamps, rosettes, and receptacles shall have no live parts normally exposed to employee contact. However, rosettes and cleat-type lampholders and receptacles located at least 8 feet (2.44 m) above the floor may have exposed parts.

(ii) Support. Fixtures, lampholders, rosettes, and receptacles shall be securely supported. A fixture that weighs more than 6 pounds (2.72 kg) or exceeds 16 inches (406 mm) in any dimension shall not be supported by the screw shell of a lampholder.

(iii) Portable lamps. Portable lamps shall be wired with flexible cord and an attachment plug of the polarized or grounding type. If the portable lamp uses an Edison-based lampholder, the grounded conductor shall be identified and attached to the screw shell and the identified blade of the attachment plug. In addition, portable handlamps shall comply with the following:

(A) Metal shell, paperlined lampholders shall not be used;

(B) Handlamps shall be equipped with a handle of molded composition or other insulating material;

(C) Handlamps shall be equipped with a substantial guard attached to the lampholder or handle;

(D) Metallic guards shall be grounded by the means of an equipment grounding conductor run within the power supply cord.

(iv) Lampholders. Lampholders of the screw-shell type shall be installed for use as lampholders only. Lampholders installed in wet or damp locations shall be of the weather-proof type.

(v) Fixtures. Fixtures installed in wet or damp locations shall be identified for the purpose and shall be installed so that water cannot enter or accumulate in wireways, lampholders, or other electrical parts.

(b) Receptacles, cord connectors, and attachment plugs (caps).

(i) Configuration. Receptacles, cord connectors, and attachment plugs shall be constructed so that no receptacle or cord connector will accept an attachment plug with a different voltage or current rating than that for which the device is intended. However, a 20-ampere T-slot receptacle or cord connector may accept a 15-ampere attachment plug of the same voltage rating. Receptacles connected to circuits having different voltages, frequencies, or types of current (AC or DC) on the same premises shall be of such design

that the attachment plugs used on these circuits are not interchangeable.

(ii) Damp and wet locations. A receptacle installed in a wet or damp location shall be designed for the location.

(c) Appliances.

(i) Live parts. Appliances, other than those in which the current-carrying parts at high temperatures are necessarily exposed, shall have no live parts normally exposed to employee contact.

(ii) Disconnecting means. A means shall be provided to disconnect each appliance.

(iii) Rating. Each appliance shall be marked with its rating in volts and amperes or volts and watts.

(d) Motors. This subdivision applies to motors, motor circuits, and controllers.

(i) In sight from. If specified that one piece of equipment shall be "in sight from" another piece of equipment, one shall be visible and not more than 50 feet (15.2 m) from the other.

(ii) Disconnecting means.

(A) A disconnecting means shall be located in sight from the controller location. The controller disconnecting means for motor branch circuits over 600 volts, nominal, may be out of sight of the controller, if the controller is marked with a warning label giving the location and identification of the disconnecting means which is to be locked in the open position.

(B) The disconnecting means shall disconnect the motor and the controller from all ungrounded supply conductors and shall be so designed that no pole can be operated independently.

(C) If a motor and the driven machinery are not in sight from the controller location, the installation shall comply with one of the following conditions:

(I) The controller disconnecting means shall be capable of being locked in the open position.

(II) A manually operable switch that will disconnect the motor from its source of supply shall be placed in sight from the motor location.

(D) The disconnecting means shall plainly indicate whether it is in the open (off) or closed (on) position.

(E) The disconnecting means shall be readily accessible. If more than one disconnect is provided for the same equipment, only one need be readily accessible.

(F) An individual disconnecting means shall be provided for each motor, but a single disconnecting means may be used for a group of motors under any one of the following conditions:

(I) If a number of motors drive special parts of a single machine or piece of apparatus, such as a metal or wood-working machine, crane, or hoist;

(II) If a group of motors is under the protection of one set of branch-circuit protective devices; or

(III) If a group of motors is in a single room in sight from the location of the disconnecting means.

(iii) Motor overload, short-circuit, and ground-fault protection. Motors, motor-control apparatus, and motor branch-circuit conductors shall be protected against overheating due to motor overloads or failure to start, and against short-circuits or ground faults. These provisions do not require overload protection that will stop a motor where a shutdown is likely to introduce additional or increased

hazards, as in the case of fire pumps, or where continued operation of a motor is necessary for a safe shutdown of equipment or process and motor overload sensing devices are connected to a supervised alarm.

(iv) Protection of live parts—all voltages.

(A) Stationary motors having commutators, collectors, and brush rigging located inside of motor end brackets and not conductively connected to supply circuits operating at more than 150 volts to ground need not have such parts guarded. Exposed live parts of motors and controllers operating at 50 volts or more between terminals shall be guarded against accidental contact by any of the following:

(I) By installation in a room or enclosure that is accessible only to qualified persons;

(II) By installation on a balcony, gallery, or platform, so elevated and arranged as to exclude unqualified persons; or

(III) By elevation 8 feet (2.44 m) or more above the floor.

(B) Where live parts of motors or controllers operating at over 150 volts to ground are guarded against accidental contact only by location, and where adjustment or other attendance may be necessary during the operation of the apparatus, insulating mats or platforms shall be provided so that the attendant cannot readily touch live parts unless standing on the mats or platforms.

(e) Transformers.

(i) Application. The following subsections cover the installation of all transformers, except:

(A) Current transformers;

(B) Dry-type transformers installed as a component part of other apparatus;

(C) Transformers which are an integral part of an x-ray, high frequency, or electrostatic-coating apparatus;

(D) Transformers used with Class 2 and Class 3 circuits, sign and outline lighting, electric discharge lighting, and power-limited fire-protective signaling circuits.

(ii) Operating voltage. The operating voltage of exposed live parts of transformer installations shall be indicated by warning signs or visible markings on the equipment or structure.

(iii) Transformers over 35 kV. Dry-type, high fire point liquid-insulated, and askarel-insulated transformers installed indoors and rated over 35 kV shall be in a vault.

(iv) Oil-insulated transformers. If they present a fire hazard to employees, oil-insulated transformers installed indoors shall be in a vault.

(v) Fire protection. Combustible material, combustible buildings and parts of buildings, fire escapes, and door and window openings shall be safeguarded from fires which may originate in oil-insulated transformers attached to or adjacent to a building or combustible material.

(vi) Transformer vaults. Transformer vaults shall be constructed so as to contain fire and combustible liquids within the vault and to prevent unauthorized access. Locks and latches shall be so arranged that a vault door can be readily opened from the inside.

(vii) Pipes and ducts. Any pipe or duct system foreign to the vault installation shall not enter or pass through a transformer vault.

(viii) Material storage. Materials shall not be stored in transformer vaults.

(f) Capacitors.

(i) Drainage of stored charge. All capacitors, except surge capacitors or capacitors included as a component part of other apparatus, shall be provided with an automatic means of draining the stored charge and maintaining the discharged state after the capacitor is disconnected from its source of supply.

(ii) Over 600 volts. Capacitors rated over 600 volts, nominal, shall comply with the following additional requirements:

(A) Isolating or disconnecting switches (with no interrupting rating) shall be interlocked with the load interrupting device or shall be provided with prominently displayed caution signs to prevent switching load current.

(B) For series capacitors the proper switching shall be assured by use of at least one of the following:

(I) Mechanically sequenced isolating and bypass switches;

(II) Interlocks; or

(III) Switching procedure prominently displayed at the switching location.

[Statutory Authority: Chapter 49.17 RCW. 93-19-142 (Order 93-04), § 296-155-449, filed 9/22/93, effective 11/1/93; 92-23-017 (Order 92-13), § 296-155-449, filed 11/10/92, effective 12/18/92; 88-11-021 (Order 88-04), § 296-155-449, filed 5/11/88.]

WAC 296-155-452 Specific purpose equipment and installations. (1) Cranes and hoists. This subsection applies to the installation of electric equipment and wiring used in connection with cranes, monorail hoists, hoists, and all runways.

(a) Disconnecting means.

(i) Runway conductor disconnecting means. A readily accessible disconnecting means shall be provided between the runway contact conductors and the power supply.

(ii) Disconnecting means for cranes and monorail hoists. A disconnecting means, capable of being locked in the open position, shall be provided in the leads from the runway contact conductors or other power supply on any crane or monorail hoist.

(A) If this additional disconnecting means is not readily accessible from the crane or monorail hoist operating station, means shall be provided at the operating station to open the power circuit to all motors of the crane or monorail hoist.

(B) The additional disconnect may be omitted if a monorail hoist or hand-propelled crane bridge installation meets all of the following:

(I) The unit is floor controlled;

(II) The unit is within view of the power supply disconnecting means; and

(III) No fixed work platform has been provided for servicing the unit.

(b) Control. A limit switch or other device shall be provided to prevent the load block from passing the safe upper limit of travel of any hoisting mechanism.

(c) Clearance. The dimension of the working space in the direction of access to live parts which may require examination, adjustment, servicing, or maintenance while alive shall be a minimum of 2 feet 6 inches (762 mm). Where controls are enclosed in cabinets, the door(s) shall open at least 90 degrees or be removable, or the installation shall provide equivalent access.

(d) Grounding. All exposed metal parts of cranes, monorail hoists, hoists and accessories including pendant controls shall be metallically joined together into a continuous electrical conductor so that the entire crane or hoist will be grounded in accordance with WAC 296-155-434(6). Moving parts, other than removable accessories or attachments, having metal-to-metal bearing surfaces shall be considered to be electrically connected to each other through the bearing surfaces for grounding purposes. The trolley frame and bridge frame shall be considered as electrically grounded through the bridge and trolley wheels and its respective tracks unless conditions such as paint or other insulating materials prevent reliable metal-to-metal contact. In this case a separate bonding conductor shall be provided.

(2) Elevators, escalators, and moving walks.

(a) Disconnecting means. Elevators, escalators, and moving walks shall have a single means for disconnecting all ungrounded main power supply conductors for each unit.

(b) Control panels. If control panels are not located in the same space as the drive machine, they shall be located in cabinets with doors or panels capable of being locked closed.

(3) Electric welders—disconnecting means.

(a) Motor-generator, AC transformer, and DC rectifier arc welders. A disconnecting means shall be provided in the supply circuit for each motor-generator arc welder, and for each AC transformer and DC rectifier arc welder which is not equipped with a disconnect mounted as an integral part of the welder.

(b) Resistance welders. A switch or circuit breaker shall be provided by which each resistance welder and its control equipment can be isolated from the supply circuit. The ampere rating of this disconnecting means shall not be less than the supply conductor ampacity.

(4) X-ray equipment.

(a) Disconnecting means.

(i) General. A disconnecting means shall be provided in the supply circuit. The disconnecting means shall be operable from a location readily accessible from the x-ray control. For equipment connected to a 120-volt branch circuit of 30 amperes or less, a grounding-type attachment plug cap and receptacle of proper rating may serve as a disconnecting means.

(ii) More than one piece of equipment. If more than one piece of equipment is operated from the same high-voltage circuit, each piece or each group of equipment as a unit shall be provided with a high-voltage switch or equivalent disconnecting means. This disconnecting means shall be constructed, enclosed, or located so as to avoid contact by employees with its live parts.

(b) Control-radiographic and fluoroscopic types. Radiographic and fluoroscopic-type equipment shall be effectively enclosed or shall have interlocks that deenergize the equipment automatically to prevent ready access to live current-carrying parts.

[Statutory Authority: Chapter 49.17 RCW. 88-11-021 (Order 88-04), § 296-155-452, filed 5/11/88.]

WAC 296-155-456 Hazardous (classified) locations.

(1) Scope. This section sets forth requirements for electric equipment and wiring in locations which are classified

depending on the properties of the flammable vapors, liquids or gases, or combustible dusts or fibers which may be present therein and the likelihood that a flammable or combustible concentration or quantity is present. Each room, section or area shall be considered individually in determining its classification. These hazardous (classified) locations are assigned six designations as follows: Class I, Division 1; Class I, Division 2; Class II, Division 1; Class II, Division 2; Class III, Division 1; Class III, Division 2. For definitions of these locations see WAC 296-155-428. All applicable requirements in this part apply to all hazardous (classified) locations, unless modified by provisions of this section.

(a) All components and utilization equipment used in a hazardous location shall be chosen from among those listed by a nationally recognized testing laboratory, such as Underwriters' Laboratories, Inc., or Factory Mutual Engineering Corp., except custom-made components and utilization equipment.

(b) Equipment approved for a specific hazardous location shall not be installed or intermixed with equipment approved for another specific hazardous location.

(2) Electrical installations. Equipment, wiring methods, and installations of equipment in hazardous (classified) locations shall be approved as intrinsically safe or approved for the hazardous (classified) location or safe for the hazardous (classified) location. Requirements for each of these options are as follows:

(a) Intrinsically safe. Equipment and associated wiring approved as intrinsically safe is permitted in any hazardous (classified) location included in its listing or labeling.

(b) Approved for the hazardous (classified) location.

(i) General. Equipment shall be approved not only for the class of location but also for the ignitable or combustible properties of the specific gas, vapor, dust, or fiber that will be present.

Note: NFPA 70, the National Electrical Code, lists or defines hazardous gases, vapors, and dusts by "groups" characterized by their ignitable or combustible properties.

(ii) Marking. Equipment shall not be used unless it is marked to show the class, group, and operating temperature or temperature range, based on operation in a 40°C ambient, for which it is approved. The temperature marking shall not exceed the ignition temperature of the specific gas, vapor, or dust to be encountered. However, the following provisions modify this marking requirement for specific equipment:

(A) Equipment of the nonheat-producing type (such as junction boxes, conduit, and fitting) and equipment of the heat-producing type having a maximum temperature of not more than 100°C (212°F) need not have a marked operating temperature or temperature range.

(B) Fixed lighting fixtures marked for use only in Class I, Division 2 locations need not be marked to indicate the group.

(C) Fixed general-purpose equipment in Class I locations, other than lighting fixtures, which is acceptable for use in Class I, Division 2 locations need not be marked with the class, group, division, or operating temperature.

(D) Fixed dust-tight equipment, other than lighting fixtures, which is acceptable for use in Class II, Division 2 and Class III locations need not be marked with the class, group, division, or operating temperature.

(c) Safe for the hazardous (classified) location. Equipment which is safe for the location shall be of a type and design which the employer demonstrates will provide protection from the hazards arising from the combustibility and flammability of vapors, liquids, gases, dusts, or fibers.

Note: The National Electrical Code, NFPA 70, contains guidelines for determining the type and design of equipment and installations which will meet this requirement. The guidelines of this document address electric wiring, equipment, and systems installed in hazardous (classified) locations and contain specific provisions for the following: Wiring methods, wiring connections, conductor insulation, flexible cords, sealing and drainage, transformers, capacitors, switches, circuit breakers, fuses, motor controllers, receptacles, attachment plugs, meters, relays, instruments, resistors, generators, motors, lighting fixtures, storage battery charging equipment, electric cranes, electric hoists and similar equipment, utilization equipment, signaling systems, alarm systems, remote control systems, local loud speaker and communication systems, ventilation piping, live parts, lightning surge protection, and grounding. Compliance with these guidelines will constitute one means, but not the only means, of compliance with this subsection.

(3) Conduits. All conduits shall be threaded and shall be made wrench-tight. Where it is impractical to make a threaded joint tight, a bonding jumper shall be utilized.

[Statutory Authority: Chapter 49.17 RCW. 88-11-021 (Order 88-04), § 296-155-456, filed 5/11/88.]

WAC 296-155-459 Special systems. (1) Systems over 600 volts, nominal. (a) through (d) of this subsection contain general requirements for all circuits and equipment operated at over 600 volts.

(a) Wiring methods for fixed installations.

(i) Above ground. Above-ground conductors shall be installed in rigid metal conduit, in intermediate metal conduit, in cable trays, in cablebus, in other suitable raceways, or as open runs of metal-clad cable designed for the use and purpose. However, open runs of nonmetallic-sheathed cable or of bare conductors or busbars may be installed in locations which are accessible only to qualified persons. Metallic shielding components, such as tapes, wires, or braids for conductors, shall be grounded. Open runs of insulated wires and cables having a bare lead sheath or a braided outer covering shall be supported in a manner designed to prevent physical damage to the braid or sheath.

(ii) Installations emerging from the ground. Conductors emerging from the ground shall be enclosed in raceways. Raceways installed on poles shall be of rigid metal conduit, intermediate metal conduit, PVC schedule 80 or equivalent extending from the ground line up to a point 8 feet (2.44 m) above finished grade. Conductors entering a building shall be protected by an enclosure from the ground line to the point of entrance. Metallic enclosures shall be grounded.

(b) Interrupting and isolating devices.

(i) Circuit breakers. Circuit breakers located indoors shall consist of metal-enclosed or fire-resistant, cell-mounted units. In locations accessible only to qualified personnel, open mounting of circuit breakers is permitted. A means of indicating the open and closed position of circuit breakers shall be provided.

(ii) Fused cutouts. Fused cutouts installed in buildings or transformer vaults shall be of a type identified for the purpose. They shall be readily accessible for fuse replacement.

(iii) Equipment isolating means. A means shall be provided to completely isolate equipment for inspection and repairs. Isolating means which are not designed to interrupt the load current of the circuit shall be either interlocked with a circuit interrupter or provided with a sign warning against opening them under load.

(c) Mobile and portable equipment.

(i) Power cable connections to mobile machines. A metallic enclosure shall be provided on the mobile machine for enclosing the terminals of the power cable. The enclosure shall include provisions for a solid connection for the ground wire(s) terminal to ground effectively the machine frame. The method of cable termination used shall prevent any strain or pull on the cable from stressing the electrical connections. The enclosure shall have provision for locking so only authorized qualified persons may open it and shall be marked with a sign warning of the presence of energized parts.

(ii) Guarding live parts. All energized switching and control parts shall be enclosed in effectively grounded metal cabinets or enclosures. Circuit breakers and protective equipment shall have the operating means projecting through the metal cabinet or enclosure so these units can be reset without locked doors being opened. Enclosures and metal cabinets shall be locked so that only authorized qualified persons have access and shall be marked with a sign warning of the presence of energized parts. Collector ring assemblies on revolving-type machines (shovels, draglines, etc.) shall be guarded.

(d) Tunnel installations.

(i) Application. The provisions of this item apply to installation and use of high-voltage power distribution and utilization equipment which is associated with tunnels and which is portable and/or mobile, such as substations, trailers, cars, mobile shovels, draglines, hoists, drills, dredges, compressors, pumps, conveyors, and underground excavators.

(ii) Conductors. Conductors in tunnels shall be installed in one or more of the following:

(A) Metal conduit or other metal raceway;

(B) Type MC cable; or

(C) Other suitable multiconductor cable.

Conductors shall also be so located or guarded as to protect them from physical damage. Multiconductor portable cable may supply mobile equipment. An equipment grounding conductor shall be run with circuit conductors inside the metal raceway or inside the multiconductor cable jacket. The equipment grounding conductor may be insulated or bare.

(iii) Guarding live parts. Bare terminals of transformers, switches, motor controllers, and other equipment shall be enclosed to prevent accidental contact with energized parts. Enclosures for use in tunnels shall be drip-proof, weather-proof, or submersible as required by the environmental conditions.

(iv) Disconnecting means. A disconnecting means that simultaneously opens all ungrounded conductors shall be installed at each transformer or motor location.

(v) Grounding and bonding. All nonenergized metal parts of electric equipment and metal raceways and cable sheaths shall be grounded and bonded to all metal pipes and rails at the portal and at intervals not exceeding 1000 feet (305 m) throughout the tunnel.

(2) Class 1, Class 2, and Class 3 remote control, signaling, and power-limited circuits.

(a) Classification. Class 1, Class 2, or Class 3 remote control, signaling, or power-limited circuits are characterized by their usage and electrical power limitation which differentiates them from light and power circuits. These circuits are classified in accordance with their respective voltage and power limitations as summarized in (a)(i) through (iii) of this subsection.

(i) Class 1 circuits.

(A) A Class 1 power-limited circuit is supplied from a source having a rated output of not more than 30 volts and 1000 volt-amperes.

(B) A Class 1 remote control circuit or a Class 1 signaling circuit has a voltage which does not exceed 600 volts; however, the power output of the source need not be limited.

(ii) Class 2 and Class 3 circuits.

(A) Power for Class 2 and Class 3 circuits is limited either inherently (in which no overcurrent protection is required) or by a combination of a power source and overcurrent protection.

(B) The maximum circuit voltage is 150 volts AC or DC for a Class 2 inherently limited power source, and 100 volts AC or DC for a Class 3 inherently limited power source.

(C) The maximum circuit voltage is 30 volts AC and 60 volts DC for a Class 2 power source limited by overcurrent protection, and 150 volts AC or DC for a Class 3 power source limited by overcurrent protection.

(iii) Application. The maximum circuit voltages in (a)(i) and (ii) of this subsection apply to sinusoidal AC or continuous DC power sources, and where wet contact occurrence is not likely.

(b) Marking. A Class 2 or Class 3 power supply unit shall not be used unless it is durably marked where plainly visible to indicate the class of supply and its electrical rating.

(3) Communications systems.

(a) Scope. These provisions for communication systems apply to such systems as central-station-connected and noncentral-station-connected telephone circuits, radio receiving and transmitting equipment, and outside wiring for fire and burglar alarm, and similar central station systems. These installations need not comply with the provisions of WAC 296-155-444 through 296-155-459(2), except WAC 296-155-447 (3)(a)(ii) and 296-155-456.

(b) Protective devices.

(i) Circuits exposed to power conductors. Communication circuits so located as to be exposed to accidental contact with light or power conductors operating at over 300 volts shall have each circuit so exposed provided with an approved protector.

(ii) Antenna lead-ins. Each conductor of a lead-in from an outdoor antenna shall be provided with an antenna discharge unit or other means that will drain static charges from the antenna system.

(c) Conductor location.

(i) Outside of buildings.

(A) Receiving distribution lead-in or aerial-drop cables attached to buildings and lead-in conductors to radio transmitters shall be so installed as to avoid the possibility of accidental contact with electric light or power conductors.

(B) The clearance between lead-in conductors and any lightning protection conductors shall not be less than 6 feet (1.83 m).

(ii) On poles. Where practicable, communication conductors on poles shall be located below the light or power conductors. Communications conductors shall not be attached to a crossarm that carries light or power conductors.

(iii) Inside of buildings. Indoor antennas, lead-ins, and other communication conductors attached as open conductors to the inside of buildings shall be located at least 2 inches (50.8 mm) from conductors of any light or power or Class 1 circuits unless a special and equally protective method of conductor separation is employed.

(d) Equipment location. Outdoor metal structures supporting antennas, as well as self-supporting antennas such as vertical rods or dipole structures, shall be located as far away from overhead conductors of electric light and power circuits of over 150 volts to ground as necessary to avoid the possibility of the antenna or structure falling into or making accidental contact with such circuits.

(e) Grounding.

(i) Lead-in conductors. If exposed to contact with electric light or power conductors, the metal sheath of aerial cables entering buildings shall be grounded or shall be interrupted close to the entrance to the building by an insulating joint or equivalent device. Where protective devices are used, they shall be grounded.

(ii) Antenna structures. Masts and metal structures supporting antennas shall be permanently and effectively grounded without splice or connection in the grounding conductor.

(iii) Equipment enclosures. Transmitters shall be enclosed in a metal frame or grill or separated from the operating space by a barrier, all metallic parts of which are effectively connected to ground. All external metal handles and controls accessible to the operating personnel shall be effectively grounded. Unpowered equipment and enclosures shall be considered grounded where connected to an attached coaxial cable with an effectively grounded metallic shield.

[Statutory Authority: Chapter 49.17 RCW. 93-19-142 (Order 93-04), § 296-155-459, filed 9/22/93, effective 11/1/93; 88-11-021 (Order 88-04), § 296-155-459, filed 5/11/88.]

WAC 296-155-462 Definitions applicable to this part. The definitions given in this section apply to the terms used in Part I. The definitions given here for "approved" and "qualified person" apply, instead of the definitions given in WAC 296-155-012, to the use of these terms in Part I.

(1) "Acceptable." An installation or equipment is acceptable to the director, and approved within the meaning of this Part I:

(a) If it is accepted, certified, listed, labeled, or otherwise determined to be safe by a qualified testing laboratory capable of determining the suitability of materials and equipment for installation and use in accordance with this standard; or

(b) With respect to an installation or equipment of a kind which no qualified testing laboratory accepts, certifies, lists, labels, or determines to be safe, if it is inspected or tested by another state agency, or by a federal, municipal, or

other local authority responsible for enforcing occupational safety provisions of the National Electrical Code, and found in compliance with those provisions; or

(c) With respect to custom-made equipment or related installations which are designed, fabricated for, and intended for use by a particular customer, if it is determined to be safe for its intended use by its manufacturer on the basis of test data which the employer keeps and makes available for inspection to the director and his/her authorized representatives.

(2) "Accepted." An installation is "accepted" if it has been inspected and found to be safe by a qualified testing laboratory.

(3) "Accessible." (As applied to wiring methods.) Capable of being removed or exposed without damaging the building structure or finish, or not permanently closed in by the structure or finish of the building. (See "concealed" and "exposed.")

(4) "Accessible." (As applied to equipment.) Admitting close approach; not guarded by locked doors, elevation, or other effective means. (See "readily accessible.")

(5) "Ampacity." The current in amperes a conductor can carry continuously under the conditions of use without exceeding its temperature rating.

(6) "Appliances." Utilization equipment, generally other than industrial, normally built in standardized sizes or types, which is installed or connected as a unit to perform one or more functions.

(7) "Approved." Approved by the director of the department of labor and industries or his/her authorized representative: *Provided, however,* That should a provision of this chapter state that approval by an agency or organization other than the department of labor and industries is required, such as Underwriters' Laboratories, the Bureau of Mines, or Mine Safety and Health Administration (MSHA) and the National Institute for Occupational Safety and Health (NIOSH) the provisions of WAC 296-155-006 shall apply.

(8) "Askarel." A generic term for a group of nonflammable synthetic chlorinated hydrocarbons used as electrical insulating media. Askarels of various compositional types are used. Under arcing conditions the gases produced, while consisting predominantly of noncombustible hydrogen chloride, can include varying amounts of combustible gases depending upon the askarel type.

(9) "Attachment plug (plug cap) (cap)." A device which, by insertion in a receptacle, establishes connection between the conductors of the attached flexible cord and the conductors connected permanently to the receptacle.

(10) "Automatic." Self-acting, operating by its own mechanism when actuated by some impersonal influence, as for example, a change in current strength, pressure, temperature, or mechanical configuration.

(11) "Bare conductor." See "conductor."

(12) "Bonding." The permanent joining of metallic parts to form an electrically conductive path which will assure electrical continuity and the capacity to conduct safely any current likely to be imposed.

(13) "Bonding jumper." A reliable conductor to assure the required electrical conductivity between metal parts required to be electrically connected.

(14) "Branch circuits." That portion of a wiring system extending beyond the final overcurrent device protecting the

circuit. (A device not approved for branch circuit protection, such as thermal cutout or motor overload protective device, is not considered as the overcurrent device protecting the circuit.)

(15) "Building." A structure which stands alone or which is cut off from adjoining structures by fire walls with all openings therein protected by approved fire doors.

(16) "Cabinet." An enclosure designed either for surface or flush mounting, and provided with a frame, mat, or trim in which a swinging door or doors are or may be hung.

(17) "Certified." Equipment is "certified" if it:

(a) Has been tested and found by a qualified testing laboratory to meet applicable test standards or to be safe for use in a specified manner; and

(b) Is of a kind whose production is periodically inspected by a qualified testing laboratory. Certified equipment must bear a label, tag, or other record of certification.

(18) "Circuit breaker."

(a) (600 volts nominal, or less.) A device designed to open and close a circuit by nonautomatic means and to open the circuit automatically on a predetermined overcurrent without injury to itself when properly applied within its rating.

(b) (Over 600 volts, nominal.) A switching device capable of making, carrying, and breaking currents under normal circuit conditions, and also making, carrying for a specified time, and breaking currents under specified abnormal circuit conditions, such as those of short circuit.

(19) "Class I locations." Class I locations are those in which flammable gases or vapors are or may be present in the air in quantities sufficient to produce explosive or ignitable mixtures. Class I locations include the following:

(a) Class I, Division 1. A Class I, Division 1 location is a location:

(i) In which ignitable concentrations of flammable gases or vapors may exist under normal operating conditions; or

(ii) In which ignitable concentrations of such gases or vapors may exist frequently because of repair or maintenance operations or because of leakage; or

(iii) In which breakdown or faulty operation of equipment or processes might release ignitable concentrations of flammable gases or vapors, and might also cause simultaneous failure of electric equipment.

Note: This classification usually includes locations where volatile flammable liquids or liquefied flammable gases are transferred from one container to another; interiors of spray booths and areas in the vicinity of spraying and painting operations where volatile flammable solvents are used; locations containing open tanks or vats of volatile flammable liquids; drying rooms or compartments for the evaporation of flammable solvents; inadequately ventilated pump rooms for flammable gas or for volatile flammable liquids; and all other locations where ignitable concentrations of flammable vapors or gases are likely to occur in the course of normal operations.

(b) Class I, Division 2. A Class I, Division 2 location is a location:

(i) In which volatile flammable liquids or flammable gases are handled, processed, or used, but in which the hazardous liquids, vapors, or gases will normally be confined within closed containers or closed systems from which they can escape only in case of accidental rupture or breakdown

of such containers or systems, or in case of abnormal operation of equipment; or

(ii) In which ignitable concentrations of gases or vapors are normally prevented by positive mechanical ventilation, and which might become hazardous through failure or abnormal operations of the ventilating equipment; or

(iii) That is adjacent to a Class I, Division 1 location, and to which ignitable concentrations of gases or vapors might occasionally be communicated unless such communication is prevented by adequate positive-pressure ventilation from a source of clean air, and effective safeguards against ventilation failure are provided.

Note: This classification usually includes locations where volatile flammable liquids or flammable gases or vapors are used, but which would become hazardous only in case of an accident or of some unusual operating condition. The quantity of flammable material that might escape in case of accident, the adequacy of ventilating equipment, the total area involved, and the record of the industry or business with respect to explosions or fires are all factors that merit consideration in determining the classification and extent of each location.

Piping without valves, checks, meters, and similar devices would not ordinarily introduce a hazardous condition even though used for flammable liquids or gases. Locations used for the storage of flammable liquids or of liquefied or compressed gases in sealed containers would not normally be considered hazardous unless also subject to other hazardous conditions.

Electrical conduits and their associated enclosures separated from process fluids by a single seal or barrier are classed as a Division 2 location if the outside of the conduit and enclosures is a nonhazardous location.

(20) "Class II locations." Class II locations are those that are hazardous because of the presence of combustible dust. Class II locations include the following:

(a) Class II, Division 1. A Class II, Division 1 location is a location:

(i) In which combustible dust is or may be in suspension in the air under normal operating conditions, in quantities sufficient to produce explosive or ignitable mixtures; or

(ii) Where mechanical failure or abnormal operation of machinery or equipment might cause such explosive or ignitable mixtures to be produced, and might also provide a source of ignition through simultaneous failure of electric equipment, operation of protection devices, or from other causes; or

(iii) In which combustible dusts of an electrically conductive nature may be present.

Note: Combustible dusts which are electrically nonconductive include dusts produced in the handling and processing of grain and grain products, pulverized sugar and cocoa, dried egg and milk powders, pulverized spices, starch and pastes, potato and woodflour, oil meal from beans and seed, dried hay, and other organic materials which may produce combustible dusts when processed or handled. Dusts containing magnesium or aluminum are particularly hazardous and the use of extreme caution is necessary to avoid ignition and explosion.

(b) Class II, Division 2. A Class II, Division 2 location is a location in which:

(i) Combustible dust will not normally be in suspension in the air in quantities sufficient to produce explosive or ignitable mixtures, and dust accumulations are normally

insufficient to interfere with the normal operation of electrical equipment or other apparatus; or

(ii) Dust may be in suspension in the air as a result of infrequent malfunctioning of handling or processing equipment, and dust accumulations resulting therefrom may be ignitable by abnormal operation or failure of electrical equipment or other apparatus.

Note: This classification includes locations where dangerous concentrations of suspended dust would not be likely but where dust accumulations might form on or in the vicinity of electric equipment. These areas may contain equipment from which appreciable quantities of dust would escape under abnormal operating conditions or be adjacent to a Class II, Division 1 location, as described above, into which an explosive or ignitable concentration of dust may be put into suspension under abnormal operating conditions.

(21) "Class III locations." Class III locations are those that are hazardous because of the presence of easily ignitable fibers or flyings but in which such fibers or flyings are not likely to be in suspension in the air in quantities sufficient to produce ignitable mixtures. Class III locations include the following:

(a) Class III, Division 1. A Class III, Division 1 location is a location in which easily ignitable fibers or materials producing combustible flyings are handled, manufactured, or used.

Note: Easily ignitable fibers and flyings include rayon, cotton (including cotton linters and cotton waste), sisal or henequen, istle, jute, hemp, tow, cocoa fiber, oakum, baled waste kapok, Spanish moss, excelsior, sawdust, woodchips, and other material of similar nature.

(b) Class III, Division 2. A Class III, Division 2 location is a location in which easily ignitable fibers are stored or handled, except in process of manufacture. Collector ring. A collector ring is an assembly of slip rings for transferring electrical energy from a stationary to a rotating member.

(22) "Collector ring." A collector ring is an assembly of slip rings for transferring electrical energy from a stationary to a rotating member.

(23) "Concealed." Rendered inaccessible by the structure or finish of the building. Wires in concealed raceways are considered concealed, even though they may become accessible by withdrawing them. See "accessible. (As applied to wiring methods.)"

(24) "Conductor."

(a) Bare. A conductor having no covering or electrical insulation whatsoever.

(b) Covered. A conductor encased within material of composition or thickness that is not recognized as electrical insulation.

(c) Insulated. A conductor encased within material of composition and thickness that is recognized as electrical insulation.

(25) "Controller." A device or group of devices that serves to govern, in some predetermined manner, the electric power delivered to the apparatus to which it is connected.

(26) "Covered conductor." See "conductor."

(27) "Cutout." (Over 600 volts, nominal.) An assembly of a fuse support with either a fuseholder, fuse carrier, or disconnecting blade. The fuseholder or fuse carrier may

include a conducting element (fuse link), or may act as the disconnecting blade by the inclusion of a nonfusible member.

(28) "Cutout box." An enclosure designed for surface mounting and having swinging doors or covers secured directly to and telescoping with the walls of the box proper. (See "cabinet.")

(29) "Damp location." See "location."

(30) "Dead front." Without live parts exposed to a person on the operating side of the equipment.

(31) "Device." A unit of an electrical system which is intended to carry but not utilize electric energy.

(32) "Disconnecting means." A device, or group of devices, or other means by which the conductors of a circuit can be disconnected from their source of supply.

(33) "Disconnecting (or isolating) switch." (Over 600 volts, nominal.) A mechanical switching device used for isolating a circuit or equipment from a source of power.

(34) "Dry location." See "location."

(35) "Enclosed." Surrounded by a case, housing, fence or walls which will prevent persons from accidentally contacting energized parts.

(36) "Enclosure." The case or housing of apparatus, or the fence or walls surrounding an installation to prevent personnel from accidentally contacting energized parts, or to protect the equipment from physical damage.

(37) "Equipment." A general term including material, fittings, devices, appliances, fixtures, apparatus, and the like, used as a part of, or in connection with, an electrical installation.

(38) "Equipment grounding conductor." See "grounding conductor, equipment."

(39) "Explosion-proof apparatus." Apparatus enclosed in a case that is capable of withstanding an explosion of a specified gas or vapor which may occur within it and of preventing the ignition of a specified gas or vapor surrounding the enclosure by sparks, flashes, or explosion of the gas or vapor within, and which operates at such an external temperature that it will not ignite a surrounding flammable atmosphere.

(40) "Exposed. (As applied to live parts.)" Capable of being inadvertently touched or approached nearer than a safe distance by a person. It is applied to parts not suitably guarded, isolated, or insulated. (See "accessible" and "concealed.")

(41) "Exposed. (As applied to wiring methods.)" On or attached to the surface or behind panels designed to allow access. See "accessible. (As applied to wiring methods.)"

(42) "Exposed. (For the purposes of WAC 296-155-459(3), Communications systems.)" Where the circuit is in such a position that in case of failure of supports or insulation, contact with another circuit may result.

(43) "Externally operable." Capable of being operated without exposing the operator to contact with live parts.

(44) "Feeder." All circuit conductors between the service equipment, or the generator switchboard of an isolated plant, and the final branch-circuit overcurrent device.

(45) "Festoon lighting." A string of outdoor lights suspended between two points more than 15 feet (4.57 m) apart.

(46) "Fitting." An accessory such as a locknut, bushing, or other part of a wiring system that is intended primarily to perform a mechanical rather than an electrical function.

(47) "Fuse." (Over 600 volts, nominal.) An overcurrent protective device with a circuit opening fusible part that is heated and severed by the passage of overcurrent through it. A fuse comprises all the parts that form a unit capable of performing the prescribed functions. It may or may not be the complete device necessary to connect it into an electrical circuit.

(48) "Ground." A conducting connection, whether intentional or accidental, between an electrical circuit or equipment and the earth, or to some conducting body that serves in place of the earth.

(49) "Grounded." Connected to earth or to some conducting body that serves in place of the earth.

(50) "Grounded, effectively." (Over 600 volts, nominal.) Permanently connected to earth through a ground connection of sufficiently low impedance and having sufficient ampacity that ground fault current which may occur cannot build up to voltages dangerous to personnel.

(51) "Grounded conductor." A system or circuit conductor that is intentionally grounded.

(52) "Grounding conductor." A conductor used to connect equipment or the grounded circuit of a wiring system to a grounding electrode or electrodes.

(53) "Grounding conductor, equipment." The conductor used to connect the noncurrent-carrying metal parts of equipment, raceways, and other enclosures to the system grounded conductor and/or the grounding electrode conductor at the service equipment or at the source of a separately derived system.

(54) "Grounding electrode conductor." The conductor used to connect the grounding electrode to the equipment grounding conductor and/or to the grounded conductor of the circuit at the service equipment or at the source of a separately derived system.

(55) "Ground-fault circuit interrupter." A device for the protection of personnel that functions to deenergize a circuit or portion thereof within an established period of time when a current to ground exceeds some predetermined value that is less than that required to operate the overcurrent protective device of the supply circuit.

(56) "Guarded." Covered, shielded, fenced, enclosed, or otherwise protected by means of suitable covers, casings, barriers, rails, screens, mats, or platforms to remove the likelihood of approach to a point of danger or contact by persons or objects.

(57) "Hazard." That condition, potential or inherent, which is likely to cause injury, death, or occupational disease.

(58) "Hoistway." Any shaftway, hatchway, well hole, or other vertical opening or space in which an elevator or dumbwaiter is designed to operate.

(59) "Identified (conductors or terminals)." Identified, as used in reference to a conductor or its terminal, means that such conductor or terminal can be recognized as grounded.

(60) "Identified (for the use)." Recognized as suitable for the specific purpose, function, use, environment, application, etc., where described as a requirement in this standard. Suitability of equipment for a specific purpose, environment, or application is determined by a qualified testing laboratory where such identification includes labeling or listing.

(61) "Insulated conductor." See "conductor."

(62) "Interrupter switch." (Over 600 volts, nominal.) A switch capable of making, carrying, and interrupting specified currents.

(63) "Intrinsically safe equipment and associated wiring." Equipment and associated wiring in which any spark or thermal effect, produced either normally or in specified fault conditions, is incapable, under certain prescribed test conditions, of causing ignition of a mixture of flammable or combustible material in air in its most easily ignitable concentration.

(64) "Isolated." Not readily accessible to persons unless special means for access are used.

(65) "Isolated power system." A system comprising an isolating transformer or its equivalent, a line isolation monitor, and its ungrounded circuit conductors.

(66) "J-Box (junction box)." An electrical sheet metal enclosure with openings for conduit or cable with sheet metal cover. The primary purpose is for joining conductors for splicing.

(67) "Labeled." Equipment or materials to which has been attached a label, symbol or other identifying mark of a qualified testing laboratory which indicates compliance with appropriate standards or performance in a specified manner.

(68) "Lighting outlet." An outlet intended for the direct connection of a lampholder, a lighting fixture, or a pendant cord terminating in a lampholder.

(69) "Listed." Equipment or materials included in a list published by a qualified testing laboratory whose listing states either that the equipment or material meets appropriate standards or has been tested and found suitable for use in a specified manner.

(70) "Location."

(a) Damp location. Partially protected locations under canopies, marquees, roofed open porches, and like locations, and interior locations subject to moderate degrees of moisture, such as some basements.

(b) Dry location. A location not normally subject to dampness or wetness. A location classified as dry may be temporarily subject to dampness or wetness, as in the case of a building under construction.

(c) Wet location. Installations underground or in concrete slabs or masonry in direct contact with the earth, and locations subject to saturation with water or other liquids, such as locations exposed to weather and unprotected.

(71) "Mobile x-ray." X-ray equipment mounted on a permanent base with wheels and/or casters for moving while completely assembled.

(72) "Motor control center." An assembly of one or more enclosed sections having a common power bus and principally containing motor control units.

(73) "Outlet." A point on the wiring system at which current is taken to supply utilization equipment.

(74) "Overcurrent." Any current in excess of the rated current of equipment or the ampacity of a conductor. It may result from overload (see definition), short circuit, or ground fault. A current in excess of rating may be accommodated by certain equipment and conductors for a given set of conditions. Hence the rules for overcurrent protection are specific for particular situations.

(75) "Overload." Operation of equipment in excess of normal, full load rating, or of a conductor in excess of rated

ampacity which, when it persists for a sufficient length of time, would cause damage or dangerous overheating. A fault, such as a short circuit or ground fault, is not an overload. (See "overcurrent.")

(76) "Panelboard." A single panel or group of panel units designed for assembly in the form of a single panel; including buses, automatic overcurrent devices, and with or without switches for the control of light, heat, or power circuits; designed to be placed in a cabinet or cutout box placed in or against a wall or partition and accessible only from the front. (See "switchboard.")

(77) "Portable x-ray." X-ray equipment designed to be hand-carried.

(78) "Power fuse." (Over 600 volts, nominal.) See "fuse."

(79) "Power outlet." An enclosed assembly which may include receptacles, circuit breakers, fuseholders, fused switches, buses and watt-hour meter mounting means; intended to serve as a means for distributing power required to operate mobile or temporarily installed equipment.

(80) "Premises wiring system." That interior and exterior wiring, including power, lighting, control, and signal circuit wiring together with all of its associated hardware, fittings, and wiring devices, both permanently and temporarily installed, which extends from the load end of the service drop, or load end of the service lateral conductors to the outlet(s). Such wiring does not include wiring internal to appliances, fixtures, motors, controllers, motor control centers, and similar equipment.

(81) "Qualified person." One familiar with the construction and operation of the equipment and the hazards involved.

(82) "Qualified testing laboratory." A properly equipped and staffed testing laboratory which has capabilities for and which provides the following services:

(a) Experimental testing for safety of specified items of equipment and materials referred to in this standard to determine compliance with appropriate test standards or performance in a specified manner;

(b) Inspecting the run of such items of equipment and materials at factories for product evaluation to assure compliance with the test standards;

(c) Service-value determinations through field inspections to monitor the proper use of labels on products and with authority for recall of the label in the event a hazardous product is installed;

(d) Employing a controlled procedure for identifying the listed and/or labeled equipment or materials tested; and

(e) Rendering creditable reports or findings that are objective and without bias of the tests and test methods employed.

(83) "Raceway." A channel designed expressly for holding wires, cables, or busbars, with additional functions as permitted in this part. Raceways may be of metal or insulating material, and the term includes rigid metal conduit, rigid nonmetallic conduit, intermediate metal conduit, liquidtight flexible metal conduit, flexible metallic tubing, flexible metal conduit, electrical metallic tubing, underfloor raceways, cellular concrete floor raceways, cellular metal floor raceways, surface raceways, wireways, and busways.

(84) "Readily accessible." Capable of being reached quickly for operation, renewal, or inspections, without requiring those to whom ready access is requisite to climb over or remove obstacles or to resort to portable ladders, chairs, etc. (See "accessible.")

(85) "Receptacle." A receptacle is a contact device installed at the outlet for the connection of a single attachment plug. A single receptacle is a single contact device with no other contact device on the same yoke. A multiple receptacle is a single device containing two or more receptacles.

(86) "Receptacle outlet." An outlet where one or more receptacles are installed.

(87) "Remote-control circuit." Any electric circuit that controls any other circuit through a relay or an equivalent device.

(88) "Sealable equipment." Equipment enclosed in a case or cabinet that is provided with a means of sealing or locking so that live parts cannot be made accessible without opening the enclosure. The equipment may or may not be operable without opening the enclosure.

(89) "Separately derived system." A premises wiring system whose power is derived from generator, transformer, or converter windings and has no direct electrical connection, including a solidly connected grounded circuit conductor, to supply conductors originating in another system.

(90) "Service." The conductors and equipment for delivering energy from the electricity supply system to the wiring system of the premises served.

(91) "Service conductors." The supply conductors that extend from the street main or from transformers to the service equipment of the premises supplied.

(92) "Service drop." The overhead service conductors from the last pole or other aerial support to and including the splices, if any, connecting to the service-entrance conductors at the building or other structure.

(93) "Service-entrance conductors, overhead system." The service conductors between the terminals of the service equipment and a point usually outside the building, clear of building walls, where joined by tap or splice to the service drop.

(94) "Service-entrance conductors, underground system." The service conductors between the terminals of the service equipment and the point of connection to the service lateral. Where service equipment is located outside the building walls, there may be no service-entrance conductors, or they may be entirely outside the building.

(95) "Service equipment." The necessary equipment, usually consisting of a circuit breaker or switch and fuses, and their accessories, located near the point of entrance of supply conductors to a building or other structure, or an otherwise defined area, and intended to constitute the main control and means of cutoff of the supply.

(96) "Service raceway." The raceway that encloses the service-entrance conductors.

(97) "Shock hazard." To exist at an accessible part in a circuit between the part and ground, or other accessible parts if the potential is more than 42.4 volts peak and the current through a 1,500-ohm load is more than 5 milliamperes.

(98) "Signaling circuit." Any electric circuit that energizes signaling equipment.

(99) "Switchboard." A large single panel, frame, or assembly of panels which have switches, buses, instruments, overcurrent and other protective devices mounted on the face or back or both. Switchboards are generally accessible from the rear as well as from the front and are not intended to be installed in cabinets. (See "panelboard.")

(100) "Switches."

(a) General-use switch. A switch intended for use in general distribution and branch circuits. It is rated in amperes, and it is capable of interrupting its rated current at its rated voltage.

(b) General-use snap switch. A form of general-use switch so constructed that it can be installed in flush device boxes or on outlet box covers, or otherwise used in conjunction with wiring systems recognized by this part.

(c) Isolating switch. A switch intended for isolating an electric circuit from the source of power. It has no interrupting rating, and it is intended to be operated only after the circuit has been opened by some other means.

(d) Motor-circuit switch. A switch, rated in horsepower, capable of interrupting the maximum operating overload current of a motor of the same horsepower rating as the switch at the rated voltage.

(101) "Switching devices." (Over 600 volts, nominal.) Devices designed to close and/or open one or more electric circuits. Included in this category are circuit breakers, cutouts, disconnecting (or isolating) switches, disconnecting means, and interrupter switches.

(102) "Transformer." A transformer is an apparatus for converting electrical power in an a-c system at one voltage or current into electrical power at some other voltage or current without the use of rotating parts.

(103) "Transportable x-ray." X-ray equipment installed in a vehicle or that may readily be disassembled for transport in a vehicle.

(104) "Utilization equipment." Utilization equipment means equipment which utilizes electric energy for mechanical, chemical, heating, lighting, or similar useful purpose.

(105) "Utilization system." A utilization system is a system which provides electric power and light for employee workplaces, and includes the premises wiring system and utilization equipment.

(106) "Ventilated." Provided with a means to permit circulation of air sufficient to remove an excess of heat, fumes, or vapors.

(107) "Volatile flammable liquid." A flammable liquid having a flash point below 38°C (100°F) or whose temperature is above its flash point, or a Class II combustible liquid having a vapor pressure not exceeding 40 psia (276 kPa) at 38°C (100°F) whose temperature is above its flash point.

(108) "Voltage." (Of a circuit.) The greatest root-mean-square (effective) difference of potential between any two conductors of the circuit concerned.

(109) "Voltage, nominal." A nominal value assigned to a circuit or system for the purpose of conveniently designating its voltage class (as 120/240, 480Y/277, 600, etc.). The actual voltage at which a circuit operates can vary from the nominal within a range that permits satisfactory operation of equipment.

(110) "Voltage to ground." For grounded circuits, the voltage between the given conductor and that point or conductor of the circuit that is grounded; for ungrounded

circuits, the greatest voltage between the given conductor and any other conductor of the circuit.

(111) "Watertight." So constructed that moisture will not enter the enclosure.

(112) "Weatherproof." So constructed or protected that exposure to the weather will not interfere with successful operation. Rainproof, raintight, or watertight equipment can fulfill the requirements for weatherproof where varying weather conditions other than wetness, such as snow, ice, dust, or temperature extremes, are not a factor.

(113) "Wet location." See "location."

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-462, filed 7/20/94, effective 9/20/94; 93-19-142 (Order 93-04), § 296-155-462, filed 9/22/93, effective 11/1/93; 88-11-021 (Order 88-04), § 296-155-462, filed 5/11/88.]

PART J STAIRWAYS AND LADDERS

WAC 296-155-475 Scope and application. This part applies to all stairways and ladders used in construction, alteration, repair (including painting and decorating), and demolition workplaces covered under chapter 296-155 WAC, and also sets forth, in specified circumstances, when ladders and stairways are required to be provided. Additional requirements for ladders used on or with scaffolds are contained in chapter 296-155 WAC, Part J-1.

[Statutory Authority: Chapter 49.17 RCW. 91-24-017 (Order 91-07), § 296-155-475, filed 11/22/91, effective 12/24/91. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-475, filed 1/21/86; Order 76-6, § 296-155-475, filed 3/1/76; Order 74-26, § 296-155-475, filed 5/7/74, effective 6/6/74.]

WAC 296-155-47501 Definitions applicable to this part. (1) Cleat means a ladder crosspiece of rectangular cross section placed on edge upon which a person may step while ascending or descending a ladder.

(2) Double-cleat ladder means a ladder similar in construction to a single-cleat ladder, but with a center rail to allow simultaneous two-way traffic for employees ascending or descending.

(3) Equivalent means alternative designs, materials, or methods that the employer can demonstrate will provide an equal or greater degree of safety for employees than the method or item specified in the standard.

(4) Extension trestle ladder means a self-supporting portable ladder, adjustable in length, consisting of a trestle ladder base and a vertically adjustable extension section, with a suitable means for locking the ladders together (also see trestle ladder).

(5) Failure means load refusal, breakage, or separation of component parts. Load refusal is the point where the structural members lose their ability to carry the loads.

(6) Fixed ladder means a ladder that cannot be readily moved or carried because it is an integral part of a building or structure. A side-step fixed ladder is a fixed ladder that requires a person getting off at the top to step to the side of the ladder side rails to reach the landing. A through fixed ladder is a fixed ladder that requires a person getting off at the top to step between the side rails of the ladder to reach the landing. For the purpose of this standard, slip forms and

scaffolds with built in ladders permanently attached, are considered to be fixed ladders.

(7) Handrail means a rail used to provide employees with a handhold for support.

(8) Individual-rung/step ladders means ladders without a side rail or center rail support. Such ladders are made by mounting individual steps or rungs directly to the side or wall of the structure.

(9) Job-made ladder means a ladder that is fabricated, not commercially manufactured. This definition does not apply to any individual-rung/step ladders.

(10) Ladder types. For the purpose of this standard ladder types are defined by the following types:

Type IA - Extra heavy duty industrial use.

Type I - Heavy duty industrial use such as utilities and contractors.

Type II - Medium duty industrial use such as painters, offices, and light industrial use.

Type III - Light duty household use.

(11) Landing means any area such as the ground, roof, or platform that provides access/egress for a ladder.

(12) Lower levels means those areas to which an employee can fall from a stairway or ladder. Such areas include ground levels, floors, roofs, ramps, runways, excavations, pits, tanks, material, water, equipment, and similar surfaces. It does not include the surface from which the employee falls.

(13) Maximum intended load means the total load of all employees, equipment, tools, materials, transmitted loads, and other loads anticipated to be applied to a ladder component at any one time.

(14) Nosing means that portion of a tread projecting beyond the face of the riser immediately below.

(15) Platform means a walking/working surface for persons, elevated above the surrounding floor or ground.

(16) Point of access means all areas used by employees for work-related passage from one area or level to another. Such open areas include doorways, passageways, stairway openings, studded walls, and various other permanent or temporary openings used for such travel.

(17) Portable ladder means a ladder that can be readily moved or carried.

(18) Riser height means the vertical distance from the top of a tread to the top of the next higher tread or platform/landing or the distance from the top of a platform/landing to the top of the next higher tread or platform/landing.

(19) Side-step fixed ladder. See "fixed ladder."

(20) Single-cleat ladder means a ladder consisting of a pair of side rails, connected together by cleats, rungs, or steps.

(21) Single-rail ladder means a portable ladder with rungs, cleats, or steps mounted on a single rail instead of the normal two rails used on most other ladders. Single rail ladders are prohibited from use.

(22) Special purpose ladder means a portable ladder that represents either a modification or a combination of design or construction features in one of the general purpose types of ladders previously defined, in order to adapt the ladder to special or specific uses.

(23) Spiral stairway means a series of steps attached to a vertical pole and progressing upward in a winding fashion within a cylindrical space.

(24) Stairrail system means a vertical barrier erected along the unprotected sides and edges of a stairway to prevent employees from falling to lower levels. The top surface of a stairrail system may also be a "handrail."

(25) Step stool (ladder type) means a self-supporting, foldable, portable ladder, nonadjustable in length, 32 inches or less in overall size, with flat steps and without a pail shelf, designed to be climbed on the ladder top cap as well as all steps. The side rails may continue above the top cap.

(26) Through fixed ladder. See "fixed ladder."

(27) Tread depth means the horizontal distance from front to back of a tread (excluding nosing, if any).

(28) Trestle ladder means a self-supporting portable ladder, nonadjustable in length, consisting of two sections hinged at the top to form equal angles with the base. The size is designated by the length of the side rails measured along the front edge.

(29) Unprotected sides and edges means any side or edge (except at entrances to points of access) of a stairway where there is no stairrail system or wall 36 inches (.9 m) or more in height, and any side or edge (except at entrances to points of access) of a stairway landing, or ladder platform where there is no wall or guardrail system 39 inches (1 m) or more in height.

[Statutory Authority: Chapter 49.17 RCW. 91-24-017 (Order 91-07), § 296-155-47501, filed 11/22/91, effective 12/24/91.]

WAC 296-155-476 General requirements. (1) A stairway or ladder shall be provided at all personnel points of access where there is a break in elevation of 19 inches (48 cm) or more, and no ramp, runway, sloped embankment, or personnel hoist is provided.

(a) Employees shall not use any spiral stairways that will not be a permanent part of the structure on which construction work is being performed.

(b) A double-cleated ladder or two or more separate ladders shall be provided when ladders are the only mean of access or exit from a working area for 25 or more employees, or when a ladder is to serve simultaneous two-way traffic.

(c) When a building or structure has only one point of access between levels, that point of access shall be kept clear to permit free passage of employees. When work must be performed or equipment must be used such that free passage at that point of access is restricted, a second point of access shall be provided and used.

(d) When a building or structure has two or more points of access between levels, at least one point of access shall be kept clear to permit free passage of employees.

(2) Employers shall provide and install all stairway and ladder fall protection systems required by this part and shall comply with all other pertinent requirements of this part before employees begin the work that necessitates the installation and use of stairways, ladders, and their respective fall protection systems.

[Statutory Authority: Chapter 49.17 RCW. 91-24-017 (Order 91-07), § 296-155-476, filed 11/22/91, effective 12/24/91.]

WAC 296-155-477 Stairways. (1) General. The following requirements apply to all stairways as indicated:

(a) Stairways that will not be a permanent part of the structure on which construction work is being performed shall have landings of not less than 30 inches (76 cm) in the direction of travel and extend at least 22 inches (56 cm) in width at every 12 feet (3.7 m) or less of vertical rise.

(b) Stairs shall be installed between 30 deg. and 50 deg. from horizontal.

(c) In all buildings or structures two or more stories or twenty-four feet or more in height or depth, suitable permanent or temporary stairways shall be installed.

(d) Stairways, ramps or ladders shall be provided at all points where a break in elevation of eighteen inches or more occurs in a frequently traveled passageway, entry or exit.

(e) A minimum of one stairway shall be provided for access and exit for buildings and structures to three stories or thirty-six feet; if more than three stories or thirty-six feet, two or more stairways shall be provided. Where two stairways are provided and work is being performed in the stairways, one shall be maintained clear for access between levels at all times.

(f) Wood frame buildings.

(i) The stairway to a second or higher floor shall be completed before studs are raised to support the next higher floor.

(ii) Roof and attic work areas of all buildings shall be provided with a safe means of access and egress, such as stairways, ramps or ladders.

(iii) Cleats shall not be nailed to studs to provide access to and egress from roof or other work areas.

(g) Steel frame buildings. Stairways shall extend to the uppermost floor that has been planked or decked. Ladders may be used above that point.

(h) Reinforced concrete or composite steel—Concrete buildings. Stairways shall extend to the lowermost floor upon which a complete vertical shoring system is in place. A minimum of two ladders at different locations for each floor may be used above this floor but not to exceed three floors.

(i) Riser height and tread depth shall be uniform within each flight of stairs, including any foundation structure used as one or more treads of the stairs. Variations in riser height or tread depth shall not be over 1/4-inch (0.6 cm) in any stairway system.

(j) Where doors or gates open directly on a stairway, a platform shall be provided, and the swing of the door shall not reduce the effective width of the platform to less than 20 inches (51 cm).

(k) Metal pan landings and metal pan treads, when used, shall be secured in place before filling with concrete or other material.

(l) All parts of stairways shall be free of hazardous projections, such as protruding nails.

(m) Slippery conditions on stairways shall be eliminated before the stairways are used to reach other levels.

(n) Employers are permitted to use alternating tread type stairs as long as they install, use, and maintain the stairs in accordance with manufacturer's recommendations and the following:

(i) The stair must be installed at an angle of seventy degrees or less.

(ii) The stair must be capable of withstanding a minimum uniform load of one hundred pounds per square foot with a design factor of 1.7, and the treads must be capable of carrying a minimum concentrated load of three hundred pounds at the center of any treadspan or exterior arc with a design factor of 1.7. If the stair is intended for greater loading, construction must allow for that loading.

(iii) The stair must be equipped with a handrail on each side to assist the user in climbing or descending.

(o) Due to space limitations, when a permanent stairway must be installed at an angle above fifty degrees, such an installation (commonly called an inclined or ship's ladder) shall have treads, open risers and handrails on both sides.

(p) Where ladders are permitted for access under subsection (1) of this section, means shall be provided for employee hoisting of tools and material, such as a well wheel and hoisting line or the equivalent, so employees will have both hands free for ascending and descending ladders.

(2) Temporary service. The following requirements apply to all stairways as indicated:

(a) Except during stairway construction, foot traffic is prohibited on stairways with pan stairs where the treads and/or landings are to be filled in with concrete or other material at a later date, unless the stairs are temporarily fitted with wood or other solid material at least to the top edge of each pan. Such temporary treads and landings shall be replaced when worn below the level of the top edge of the pan.

(b) Except during stairway construction, foot traffic is prohibited on skeleton metal stairs where permanent treads and/or landings are to be installed at a later date, unless the stairs are fitted with secured temporary treads and landings long enough to cover the entire tread and/or landing area.

(c) Treads for temporary service shall be made of wood or other solid material, and shall be installed the full width and depth of the stair.

(3) Stairrails and handrails. The following requirements apply to all stairways as indicated:

(a) Stairways having four or more risers or rising more than 30 inches (76 cm), whichever is less, shall be equipped with:

(i) At least one handrail; and

(ii) One stairrail system along each unprotected side or edge.

Note: When the top edge of a stairrail system also serves as a handrail, subdivision (g) of this subsection applies.

(b) Winding and spiral stairways shall be equipped with a handrail offset sufficiently to prevent walking on those portions of the stairways where the tread width is less than 6 inches (15 cm).

(c) The height of stairrails shall be as follows:

(i) Stairrails installed after the effective date of this standard, shall be not less than 36 inches (91.5 cm) from the upper surface of the stairrail system to the surface of the tread, in line with the face of the riser at the forward edge of the tread.

(ii) Stairrails installed before the effective date of this standard, shall be not less than 30 inches (76 cm) nor more than 34 inches (86 cm) from the upper surface of the stairrail system to the surface of the tread, in line with the face of the riser at the forward edge of the tread.

(d) Midrails, screens, mesh, intermediate vertical members, or equivalent intermediate structural members, shall be provided between the top rail of the stairrail system and the stairway steps.

(i) Midrails, when used, shall be located at a height midway between the top edge of the stairrail system and the stairway steps.

(ii) Screens or mesh, when used, shall extend from the top rail to the stairway step, and along the entire opening between top rail supports.

(iii) When intermediate vertical members, such as balusters, are used between posts, they shall be not more than 19 inches (48 cm) apart.

(iv) Other structural members, when used, shall be installed such that there are no openings in the stairrail system that are more than 19 inches (48 cm) wide.

(e) Handrails and the top rails of stairrail systems shall be capable of withstanding, without failure, a force of at least 200 pounds (890 n) applied within 2 inches (5 cm) of the top edge, in any downward or outward direction, at any point along the top edge.

(f) The height of handrails shall be not more than 37 inches (94 cm) nor less than 30 inches (76 cm) from the upper surface of the handrail to the surface of the tread, in line with the face of the riser at the forward edge of the tread.

(g) When the top edge of a stairrail system also serves as a handrail, the height of the top edge shall be not more than 37 inches (94 cm) nor less than 36 inches (91.5 cm) from the upper surface of the stairrail system to the surface of the tread, in line with the face of the riser at the forward edge of the tread.

(h) Stairrail systems and handrails shall be so surfaced as to prevent injury to employees from punctures or lacerations, and to prevent snagging of clothing.

(i) Handrails shall provide an adequate handhold for employees grasping them to avoid falling.

(j) The ends of stairrail systems and handrails shall be constructed so as not to constitute a projection hazard.

(k) Handrails that will not be a permanent part of the structure being built shall have a minimum clearance of 3 inches (8 cm) between the handrail and walls, stairrail systems, and other objects.

(l) Unprotected sides and edges of stairway landings shall be provided with guardrail systems. Guardrail system criteria are contained in chapter 296-155 WAC, Part K.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-24-051, § 296-155-477, filed 11/27/96, effective 2/1/97. Statutory Authority: Chapter 49.17 RCW. 95-10-016, § 296-155-477, filed 4/25/95, effective 10/1/95; 91-24-017 (Order 91-07), § 296-155-477, filed 11/22/91, effective 12/24/91.]

WAC 296-155-480 Ladders. (1) General. The following requirements apply to all ladders as indicated, including job-made ladders.

(a) Ladders shall be capable of supporting the following loads without failure:

(i) Each self-supporting portable ladder: At least four times the maximum intended load, except that each extra-heavy-duty type 1A metal or plastic ladder shall sustain at least 3.3 times the maximum intended load. The ability of a ladder to sustain the loads indicated in this section shall be

determined by applying or transmitting the requisite load to the ladder in a downward vertical direction. Ladders built and tested in conformance with the applicable provisions of appendix A of this part will be deemed to meet this requirement.

(ii) Each portable ladder that is not self-supporting: At least four times the maximum intended load, except that each extra-heavy-duty type 1A metal or plastic ladders shall sustain at least 3.3 times the maximum intended load. The ability of a ladder to sustain the loads indicated in this section shall be determined by applying or transmitting the requisite load to the ladder in a downward vertical direction when the ladder is placed at an angle of 75 1/2 degrees from the horizontal. Ladders built and tested in conformance with the applicable provisions of appendix A will be deemed to meet this requirement.

(iii) Each fixed ladder: At least two loads of 250 pounds (114 kg) each, concentrated between any two consecutive attachments (the number and position of additional concentrated loads of 250 pounds (114 kg) each, determined from anticipated usage of the ladder, shall also be included), plus anticipated loads caused by ice buildup, winds, rigging, and impact loads resulting from the use of ladder safety devices. Each step or rung shall be capable of supporting a single concentrated load of at least 250 pounds (114 kg) applied in the middle of the step or rung. Ladders built in conformance with the applicable provisions of appendix A will be deemed to meet this requirement.

(b) Ladder rungs, cleats, and steps shall be parallel, level, and uniformly spaced when the ladder is in position for use.

(c)(i) Rungs, cleats, and steps of portable ladders (except as provided below) and fixed ladders (including individual-rung/step ladders) shall be spaced not less than 10 inches (25 cm) apart, nor more than 14 inches (36 cm) apart, as measured between centerlines of the rungs, cleats, and steps.

(ii) Rungs, cleats, and steps of step stools shall be not less than 8 inches (20 cm) apart, nor more than 12 inches (31 cm) apart, as measured between centerlines of the rungs, cleats, and steps.

(iii) Rungs, cleats, and steps of the base section of extension trestle ladders shall be not less than 8 inches (20 cm) nor more than 18 inches (46 cm) apart, as measured between centerlines of the rungs, cleats, and steps. The rung spacing on the extension section of the extension trestle ladder shall be not less than 6 inches (15 cm) nor more than 12 inches (31 cm), as measured between centerlines of the rungs, cleats, and steps.

(iv) Cleats on job-made ladders shall be inset into the edges of the side-rails one-half inch, or filler blocks shall be used on the side-rails between the cleats.

(v) Cleats on job-made ladders shall be secured to each rail with three 10d common wire nails or other fasteners of equivalent strength.

(d)(i) The minimum clear distance between the sides of individual-rung/step ladders and the minimum clear distance between the side rails of other fixed ladders shall be 16 inches (41 cm).

(ii) The minimum clear distance between side rails for all portable ladders shall be 11 1/2 inches (29 cm).

(e) The rungs of individual-rung/step ladders shall be shaped such that employees' feet cannot slide off the end of the rungs.

(f)(i) The rungs and steps of fixed metal ladders manufactured after the effective date of this standard, shall be corrugated, knurled, dimpled, coated with skid-resistant material, or otherwise treated to minimize slipping.

(ii) The rungs and steps of portable metal ladders shall be corrugated, knurled, dimpled, coated with skid-resistant material, or otherwise treated to minimize slipping.

(g) Ladders shall not be tied or fastened together to provide longer sections unless they are specifically designed for such use.

(h) A metal spreader or locking device shall be provided on each stepladder to hold the front and back sections in an open position when the ladder is being used.

(i) When splicing is required to obtain a given length of side rail, the resulting side rail must be at least equivalent in strength to a one-piece side rail made of the same material.

(j) Except when portable ladders are used to gain access to fixed ladders (such as those on utility towers, billboards, and other structures where the bottom of the fixed ladder is elevated to limit access), when two or more separate ladders are used to reach an elevated work area, the ladders shall be offset with a platform or landing between the ladders. (The requirements to have guardrail systems with toeboards for falling object and overhead protection on platforms and landings are set forth in chapter 296-155 WAC, Part K.)

(k) Ladder components shall be surfaced so as to prevent injury to an employee from punctures or lacerations, and to prevent snagging of clothing.

(l) Wood ladders shall not be coated with any opaque covering, except for identification or warning labels which may be placed on one face only of a side rail.

(m) The minimum perpendicular clearance between fixed ladder rungs, cleats, and steps, and any obstruction behind the ladder shall be 7 inches (18 cm), except in the case of an elevator pit ladder, for which a minimum perpendicular clearance of 4 1/2 inches (11 cm) is required.

(n) The minimum perpendicular clearance between the center line of fixed ladder rungs, cleats, and steps, and any obstruction on the climbing side of the ladder shall be 30 inches (76 cm), except as provided in (o) of this subsection.

(o) When unavoidable obstructions are encountered, the minimum perpendicular clearance between the centerline of fixed ladder rungs, cleats, and steps, and the obstruction on the climbing side of the ladder may be reduced to 24 inches (61 cm), provided that a deflection device is installed to guide employees around the obstruction.

(p) Through fixed ladders at their point of access/egress shall have a step-across distance of not less than 7 inches (18 cm) nor more than 12 inches (30 cm) as measured from the centerline of the steps or rungs to the nearest edge of the landing area. If the normal step-across distance exceeds 12 inches (30 cm), a landing platform shall be provided to reduce the distance to the specified limit.

(q) Fixed ladders without cages or wells shall have a clear width to the nearest permanent object of at least 15 inches (38 cm) on each side of the centerline of the ladder.

(r) Fixed ladders shall be provided with cages, wells, ladder safety devices, or self-retracting lifelines where the length of climb is less than 24 feet (7.3 m) but the top of the

ladder is at a distance greater than 24 feet (7.3 m) above lower levels.

(s) Where the total length of a climb equals or exceeds 24 feet (7.3 m), fixed ladders shall be equipped with one of the following:

(i) Ladder safety devices; or

(ii) Self-retracting lifelines, and rest platforms at intervals not to exceed 150 feet (45.7 m); or

(iii) A cage or well, and multiple ladder sections, each ladder section not to exceed 50 feet (15.2 m) in length. Ladder sections shall be offset from adjacent sections, and landing platforms shall be provided at maximum intervals of 50 feet (15.2 m).

(t) Cages for fixed ladders shall conform to all of the following:

(i) Horizontal bands shall be fastened to the side rails of rail ladders, or directly to the structure, building, or equipment for individual-rung ladders;

(ii) Vertical bars shall be on the inside of the horizontal bands and shall be fastened to them;

(iii) Cages shall extend not less than 27 inches (68 cm), or more than 30 inches (76 cm) from the centerline of the step or rung (excluding the flare at the bottom of the cage), and shall not be less than 27 inches (68 cm) in width;

(iv) The inside of the cage shall be clear of projections;

(v) Horizontal bands shall be spaced not more than 4 feet (1.2 m) on center vertically;

(vi) Vertical bars shall be spaced at intervals not more than 9 1/2 inches (24 cm) on center horizontally;

(vii) The bottom of the cage shall be at a level not less than 7 feet (2.1 m) nor more than 8 feet (2.4 m) above the point of access to the bottom of the ladder. The bottom of the cage shall be flared not less than 4 inches (10 cm) all around within the distance between the bottom horizontal band and the next higher band;

(viii) The top of the cage shall be a minimum of 42 inches (1.1 m) above the top of the platform, or the point of access at the top of the ladder, with provision for access to the platform or other point of access.

(u) Wells for fixed ladders shall conform to all of the following:

(i) They shall completely encircle the ladder;

(ii) They shall be free of projections;

(iii) Their inside face on the climbing side of the ladder shall extend not less than 27 inches (68 cm) nor more than 30 inches (76 cm) from the centerline of the step or rung;

(iv) The inside clear width shall be at least 30 inches (76 cm);

(v) The bottom of the wall on the access side shall start at a level not less than 7 feet (2.1 m) nor more than 8 feet (2.4 m) above the point of access to the bottom of the ladder.

(v) Ladder safety devices, and related support systems, for fixed ladders shall conform to all of the following:

(i) They shall be capable of withstanding without failure a drop test consisting of an 18-inch (41 cm) drop of a 500-pound (226 kg) weight;

(ii) They shall permit the employee using the device to ascend or descend without continually having to hold, push or pull any part of the device, leaving both hands free for climbing;

(iii) They shall be activated within 2 feet (.61 m) after a fall occurs, and limit the descending velocity of an employee to 7 feet/sec. (2.1 m/sec.) or less;

(iv) The connection between the carrier or lifeline and the point of attachment to the body belt or harness shall not exceed 9 inches (23 cm) in length.

(w) The mounting of ladder safety devices for fixed ladders shall conform to the following:

(i) Mountings for rigid carriers shall be attached at each end of the carrier, with intermediate mountings, as necessary, spaced along the entire length of the carrier, to provide the strength necessary to stop employees' falls.

(ii) Mountings for flexible carriers shall be attached at each end of the carrier. When the system is exposed to wind, cable guides for flexible carriers shall be installed at a minimum spacing of 25 feet (7.6 m) and maximum spacing of 40 feet (12.2 m) along the entire length of the carrier, to prevent wind damage to the system.

(iii) The design and installation of mountings and cable guides shall not reduce the design strength of the ladder.

(x) The side rails of through or side-step fixed ladders shall extend 42 inches (1.1 m) above the top of the access level or landing platform served by the ladder. For a parapet ladder, the access level shall be the roof if the parapet is cut to permit passage through the parapet; if the parapet is continuous, the access level shall be the top of the parapet.

(y) For through-fixed-ladder extensions, the steps or rungs shall be omitted from the extension and the extension of the side rails shall be flared to provide not less than 24 inches (61 cm) nor more than 30 inches (76 cm) clearance between side rails. Where ladder safety devices are provided, the maximum clearance between side rails of the extensions shall not exceed 36 inches (91 cm).

(z) For side-step fixed ladders, the side rails and the steps or rungs shall be continuous in the extension.

(aa) Individual-rung/step ladders, except those used where their access openings are covered with manhole covers or hatches, shall extend at least 42 inches (1.1 m) above an access level or landing platform either by the continuation of the rung spacings as horizontal grab bars or by providing vertical grab bars that shall have the same lateral spacing as the vertical legs of the rungs.

(2) Use. The following requirements apply to the use of all ladders, including job-made ladders, except as otherwise indicated:

(a) When portable ladders are used for access to an upper landing surface, the ladder side rails shall extend at least 3 feet (.9 m) above the upper landing surface to which the ladder is used to gain access; or, when such an extension is not possible because of the ladder's length, then the ladder shall be secured at its top to a rigid support that will not deflect, and a grasping device, such as a grabrail, shall be provided to assist employees in mounting and dismounting the ladder. In no case shall the extension be such that ladder deflection under a load would, by itself, cause the ladder to slip off its support.

(b) Ladders shall be maintained free of oil, grease, and other slipping hazards.

(c) Ladders shall not be loaded beyond the maximum intended load for which they were built, nor beyond their manufacturer's rated capacity.

(d) Ladders shall be used only for the purpose for which they were designed.

(e)(i) Nonself-supporting ladders shall be used at an angle such that the horizontal distance from the top support to the foot of the ladder is approximately one-quarter of the working length of the ladder (the distance along the ladder between the foot and the top support).

(ii) Wood job-made ladders with spliced side rails shall be used at an angle such that the horizontal distance is one-eighth the working length of the ladder.

(iii) Fixed ladders shall be used at a pitch no greater than 90 degrees from the horizontal, as measured to the back side of the ladder.

(f) Ladders shall be used only on stable and level surfaces unless secured to prevent accidental displacement.

(g) Ladders shall not be used on slippery surfaces unless secured or provided with slip-resistant feet to prevent accidental displacement. Slip-resistant feet shall not be used as a substitute for care in placing, lashing, or holding a ladder that is used upon slippery surfaces including, but not limited to, flat metal or concrete surfaces that are constructed so they cannot be prevented from becoming slippery.

(h) Ladders placed in any location where they can be displaced by workplace activities or traffic, such as in passageways, doorways, or driveways, shall be secured to prevent accidental displacement, or a barricade shall be used to keep the activities or traffic away from the ladder.

(i) The area around the top and bottom of ladders shall be kept clear.

(j) The top of a nonself-supporting ladder shall be placed with the two rails supported equally unless it is equipped with a single support attachment.

(k) Ladders shall not be moved, shifted, or extended while occupied.

(l) Ladders shall have nonconductive side rails if they are used where the employee or the ladder could contact exposed energized electrical equipment, except as provided in the following:

(i) Portable metal or other portable conductive ladders shall not be used on or near energized line or equipment except where nonconductive ladders present a greater electrical hazard than conductive ladders. A greater electrical hazard would be static electricity such as might be found in extra high voltage substations.

(ii) All conductive or metal ladders shall be prominently marked and identified as being conductive.

(iii) All conductive or metal ladders shall be grounded when used near energized lines or equipment.

(m) The top or top step of a stepladder shall not be used as a step.

(n) Cross-bracing on the rear section of stepladders shall not be used for climbing unless the ladders are designed and provided with steps for climbing on both front and rear sections.

(o) Ladders shall be inspected by a competent person for visible defects on a periodic basis and after any occurrence that could affect their safe use.

(p) Portable ladders with structural defects, such as, but not limited to, broken or missing rungs, cleats, or steps, broken or split rails, corroded components, or other faulty or defective components, shall either be immediately marked in a manner that readily identifies them as defective, or be

tagged with "do not use" or similar language, and shall be withdrawn from service until repaired.

(q) Fixed ladders with structural defects, such as, but not limited to, broken or missing rungs, cleats, or steps, broken or split rails, or corroded components, shall be withdrawn from service until repaired. The requirement to withdraw a defective ladder from service is satisfied if the ladder is either:

(i) Immediately tagged with "do not use" or similar language;

(ii) Marked in a manner that readily identifies it as defective;

(iii) Or blocked (such as with a plywood attachment that spans several rungs).

(r) Ladder repairs shall restore the ladder to a condition meeting its original design criteria, before the ladder is returned to use.

(s) Single-rail ladders shall not be used.

(t) When ascending or descending a ladder, the user shall face the ladder.

(u) Employees shall not ascend or descend ladders while carrying tools or materials that might interfere with the free use of both hands.

(v) When working from a ladder, the ladder shall be secured at both top and bottom.

(w) No type of work shall be performed on a ladder over twenty-five feet from the ground or floor that requires the use of both hands to perform the work, unless a safety belt is worn and the safety lanyard is secured to the ladder.

(x) Any work that requires wearing eye protection, respirators, or handling of pressure equipment shall not be performed from a ladder more than twenty-five feet above the surrounding surface.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-24-051, § 296-155-480, filed 11/27/96, effective 2/1/97. Statutory Authority: Chapter 49.17 RCW. 95-10-016, § 296-155-480, filed 4/25/95, effective 10/1/95; 94-15-096 (Order 94-07), § 296-155-480, filed 7/20/94, effective 9/20/94; 91-24-017 (Order 91-07), § 296-155-480, filed 11/22/91, effective 12/24/91; 91-03-044 (Order 90-18), § 296-155-480, filed 1/10/91, effective 2/12/91; 90-09-026 (Order 90-01), § 296-155-480, filed 4/10/90, effective 5/25/90. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-480, filed 1/21/86. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240. 79-08-115 (Order 79-9), § 296-155-480, filed 7/31/79; Order 76-29, § 296-155-480, filed 9/30/76; Order 76-6, § 296-155-480, filed 3/1/76; Order 74-26, § 296-155-480, filed 5/7/74, effective 6/6/74.]

WAC 296-155-48060 Training requirements. The following training provisions clarify the requirements of WAC 296-155-100 (1)(c), regarding the hazards addressed in chapter 296-155 WAC, Part J.

(1)(a) The employer shall provide a training program for each employee using ladders and stairways. The program shall enable each employee to recognize hazards related to ladders and stairways, and shall train each employee in the procedures to be followed to minimize these hazards.

(b) The employer shall ensure that each employee has been trained by a competent person in the following areas, as applicable:

(i) The nature of fall hazards in the work area;

(ii) The correct procedures for erecting, maintaining, and disassembling the fall protection systems to be used;

- (iii) The proper construction, use, placement, and care in handling of all stairways and ladders;
 - (iv) The maximum intended load-carrying capacities of ladders used; and
 - (v) The standards contained in this part.
- (2) Retraining shall be provided for each employee as necessary so that the employee maintains the understanding and knowledge acquired through compliance with this section.

[Statutory Authority: Chapter 49.17 RCW. 91-24-017 (Order 91-07), § 296-155-48060, filed 11/22/91, effective 12/24/91.]

WAC 296-155-48080 Appendix A. This appendix serves as a nonmandatory guideline to assist employers in complying with the ladder loading and strength requirements of WAC 296-155-480 (1)(a). A ladder designed and built in accordance with the applicable national consensus standards, as set forth below, will be considered to meet the requirements of WAC 296-155-480 (1)(a):

** Manufactured portable wood ladders: American National Standards Institute (ANSI) A14.1-1982—American National Standard for Ladders-Portable Wood-Safety Requirements.

** Manufactured portable metal ladders: ANSI A14.2-1982—American National Standard for Ladders—Portable Metal-Safety Requirements.

** Manufactured fixed ladders: ANSI A14.3-1984—American National Standard for Ladders-Fixed-Safety Requirements.

** Job-made ladders: ANSI A14.4-1979—Safety Requirements for Job-Made Ladders.

** Plastic ladders: ANSI A14.5-1982—American National Standard for Ladders-Portable Reinforced Plastic-Safety Requirements.

[Statutory Authority: Chapter 49.17 RCW. 91-24-017 (Order 91-07), § 296-155-48080, filed 11/22/91, effective 12/24/91.]

WAC 296-155-48090 Reserved.

[Statutory Authority: Chapter 49.17 RCW. 91-24-017 (Order 91-07), § 296-155-48090, filed 11/22/91, effective 12/24/91; Order 76-29, Table J-18 (codified as WAC 296-155-48090), filed 9/30/76; Order 76-6, Table J-18, filed 3/1/76. Formerly 296-155-480 (part).]

PART J-1 SCAFFOLDING

WAC 296-155-481 Scope and application. This part applies to all scaffolding used in construction, alteration, repair (including painting and decorating), and demolition workplaces covered under chapter 296-155 WAC, and also sets forth, in specified circumstances, when scaffolding is required to be provided. Additional requirements for ladders used on or with scaffolds are contained in Part J chapter 296-155 WAC.

[Statutory Authority: Chapter 49.17 RCW. 91-24-017 (Order 91-07), § 296-155-481, filed 11/22/91, effective 12/24/91.]

WAC 296-155-483 Definitions applicable to this part. (1) "Bearer" means a horizontal member of a scaffold

upon which the platform rests and which may be supported by ledgers.

(2) "Boatswain's chair" means a seat supported by slings attached to a suspended rope, designed to accommodate one employee in a sitting position.

(3) "Brace" means a tie that holds one scaffold member in a fixed position with respect to another member.

(4) "Bricklayers' square scaffold" means a scaffold composed of framed wood squares which support a platform, limited to light and medium duty.

(5) "Built-up scaffold" means a rigidly constructed scaffold, built up where it is going to be used and dismantled when its purpose has been accomplished.

(6) "Carpenters' bracket scaffold" means a scaffold consisting of wood or metal brackets supporting a platform.

(7) "Coupler" means a device for locking together the component parts of a tubular metal scaffold. (The material used for the couplers shall be of a structural type, such as a dropforged steel, malleable iron, or structural grade aluminum.)

(8) "Crawling board or chicken ladder" means a plank with cleats spaced and secured at equal intervals, for use by a worker on roofs, not designed to carry any material.

(9) "Double pole or independent pole scaffold" means a scaffold supported from the base by a double row of uprights, independent of support from the walls and constructed of uprights, ledgers, horizontal platform bearers, and diagonal bracing.

(10) "Float or ship scaffold" means a scaffold hung from overhead supports by means of ropes and consisting of a substantial platform having diagonal bracing underneath, resting upon and securely fastened to two parallel plank bearers at right angles to the span.

(11) "Standard guardrail" means a horizontal barrier at the perimeter of any surface edge presenting a potential fall hazard constructed to provide a smooth surfaced top rail a distance of not more than 42 inches or less than 36 inches above the walking surface. An intermediate rail shall be installed half way between the walking surface and the top of the top rail.

The anchoring of posts and framing of members for railings of all types shall be such that the completed structure is capable of withstanding a load of at least 200 pounds applied in any direction at any point on the top rail with a minimum deflection.

Note: Where 2 x 4 inch lumber is used for rails and posts, upright posts spaced at intervals not exceeding 8 feet will achieve the 200 pounds loading criteria.

(12) "Heavy duty scaffold" means a scaffold designed and constructed to carry a working load not to exceed 75 pounds per square foot.

(13) "Horse scaffold" means a scaffold for light or medium duty, composed of horses supporting a work platform.

(14) "Interior hung scaffold" means a scaffold suspended from the ceiling or roof structure.

(15) "Ladder jack scaffold" means a light duty scaffold supported by brackets attached to ladders.

(16) "Leaning horse scaffold" means scaffold planks resting on two half horses supported by two legs on the

ground with the point of the bearer resting against a solid portion of a structure.

(17) "Ledgers (stringer)" mean a horizontal scaffold member which extends from post to post and which supports the putlogs or bearers forming a tie between the posts.

(18) "Light duty scaffold" means a scaffold designed and constructed to carry a working load not to exceed 25 pounds per square foot.

(19) "Manually propelled mobile scaffold" means a portable rolling scaffold supported by casters.

(20) "Masons' adjustable multiple-point suspension scaffold" means a scaffold having a continuous platform supported by bearers suspended by wire rope from overhead supports, so arranged and operated as to permit the raising or lowering of the platform to desired working positions.

(21) "Maximum rated load" means the total of all loads including the working load, the weight of the scaffold, and such other loads as may be reasonably anticipated for which the scaffold is designed.

(22) "Medium duty scaffold" means a scaffold designed and constructed to carry a working load not to exceed 50 pounds per square foot.

(23) "Midrail" means a rail approximately midway between the guardrail and platform, secured to the uprights erected along the exposed sides and ends of platforms.

(24) "Needle beam scaffold" means a light duty scaffold consisting of needle beams supporting a platform.

(25) "Outrigger scaffold" means a scaffold supported by outriggers or thrustouts projecting beyond the wall or face of the building or structure, the inboard ends of which are secured inside or on the roof of such building or structure.

(26) "Plasters-lathers scaffold" means a tubular welded scaffold erected for, and used primarily by, the plasterer and lather trades.

(27) "Putlog" means a scaffold member upon which the platform rests.

(28) "Roofing or bearer bracket" means a bracket used in slope roof construction, having provisions for fastening to the roof or supported by ropes fastened over the ridge and secured to some suitable object.

(29) "Runner" means the lengthwise horizontal bracing or bearing members or both.

(30) "Scaffold" means any temporary elevated platform and its supporting structure used for supporting workers or materials, or both.

(31) "Single-point adjustable suspension scaffold" means a manually or power-operated unit designed for light duty use, supported by a single wire rope from an overhead support so arranged and operated as to permit the raising or lowering of the platform to desired working positions.

(32) "Single-pole scaffold" means platforms resting on putlogs or cross beams, the outside ends of which are supported on ledgers secured to a single row or posts or uprights, and the inner ends of which are supported on or in a wall.

(33) "Stone setters' adjustable multiple-point suspension scaffold" means a swinging type scaffold having a platform supported by hangers suspended at four points so as to permit the raising or lowering of the platform to the desired working position by the use of hoisting machines.

(34) "Suspended scaffold" means a scaffold supported from above, the platform of which is supported at more than

two points by steel wire cables suspended from overhead outriggers which are anchored to the steel or concrete frame of the building. It is equipped with a hoisting drum or machine so the platform can be raised or lowered.

(35) "Toeboard" means a standard toeboard and shall be 4 inches nominal in vertical height from its top edge to the level of the walking surface. It shall be securely fastened in place and have not more than 1/4-inch clearance above walking surface level. It may be made of any substantial material, either solid, or with openings not over 1 inch in greatest dimension.

(36) "Tube and coupler scaffold" means an assembly consisting of tubing which serves as posts, bearers, braces, ties, and runners, a base supporting the posts, and special couplers which serve to connect the uprights and to join the various members.

(37) "Tubular welded frame scaffold" means a sectional panel or frame metal scaffold substantially built up of prefabricated welded sections which consists of posts and horizontal bearer with intermediate members.

(38) "Two-point suspension scaffold (swinging scaffold)" means a scaffold, the platform of which is supported by hangers (stirrups) at two points, suspended from overhead supports so as to permit the raising or lowering of the platform to the desired working position by tackle or hoisting machines.

(39) "Window jack scaffold" means a scaffold, the platform of which is supported by a bracket or jack which projects through a window opening.

(40) "Working load" means the load imposed by persons, materials, and equipment.

[Statutory Authority: Chapter 49.17 RCW. 91-24-017 (Order 91-07), § 296-155-483, filed 11/22/91, effective 12/24/91.]

WAC 296-155-485 Scaffolding. (1) General requirements. Scaffolds shall be furnished and erected in accordance with this standard for persons engaged in work that cannot be done safely from the ground or from solid construction, except that ladders used for such work shall conform to Part J chapter 296-155 WAC.

(a) All rules for design, construction, maintenance, operation, testing, and use of scaffolds contained in Part J-1 chapter 296-24 WAC apply within the construction industry.

(b) Scaffolds shall be erected in accordance with requirements of this section.

(c) The footing or anchorage for scaffolds shall be sound, rigid, and capable of carrying the maximum intended load without settling or displacement. Unstable objects such as barrels, boxes, loose brick, or concrete blocks, shall not be used to support scaffolds or planks.

(d) No scaffold shall be erected, moved, dismantled, or altered except under the supervision of competent persons.

(e) Standard guardrails and toeboards shall be installed on all open sides and ends of platforms more than 10 feet above the ground or floor, except needle beam scaffolds and floats. Scaffolds 4 feet to 10 feet in height, having a minimum horizontal dimension in either direction of less than 45 inches, shall have standard guardrails and toeboards installed on all open sides and ends of the scaffold platform.

(f) Where persons are required to work or pass under the scaffold, scaffolds shall be provided with a screen

between the toeboard and the guardrail, extending along the entire opening, consisting of No. 18 gauge U.S. Standard wire 1/2-inch mesh, or the equivalent.

(g) Scaffolds and their components shall be capable of supporting without failure at least 4 times the maximum intended load.

(h) Any scaffold including accessories such as braces, brackets, trusses, screw legs, ladders, etc. damaged or weakened from any cause shall be immediately repaired or replaced.

(i) All load-carrying timber members of scaffold framing shall be a minimum of 1,500 fiber (stress grade) construction grade lumber. All dimensions are nominal sizes as provided in the American Lumber Standards, except that where rough sizes are noted, only rough or undressed lumber of the size specified will satisfy minimum requirements.

(j) All planking shall be scaffold grades, or equivalent, as recognized by approved grading rules for the species of wood used. The maximum permissible spans for 2- x 10-inch or wider planks shall be as shown in Table J-1.

(k) The maximum permissible span for 1 1/4- x 9-inch or wider plank of full thickness shall be 4 feet with medium duty loading of 50 p.s.f.

(l) Platforms shall be level. All planking or platforms shall be overlapped (minimum 12 inches), or secured from movement. The platform shall be a minimum of two 2-inch by 10-inch planks in width or a minimum of 18 inches.

(m) An access ladder or equivalent safe access shall be provided.

(n) Scaffold planks shall extend over their end supports not less than 6 inches nor more than 12 inches.

(o) The poles, legs, or uprights of scaffolds shall be plumb, and securely and rigidly braced to prevent swaying and displacement.

(p) Overhead protection shall be provided for persons on a scaffold exposed to overhead hazards.

(q) Slippery conditions on scaffolds shall be eliminated as soon as possible after they occur.

(r) Welding, burning, riveting, or open flame work shall not be performed on any staging suspended by means of fiber or synthetic rope unless suspended components are well insulated to protect against damaging contacts. Only treated or protected fiber or synthetic ropes shall be used for or near any work involving the use of corrosive substances or chemicals. Specific requirements for boatswain's chairs and float or ship scaffolds are contained in subsections (10) and (21) of this section.

(s) Wire, synthetic, or fiber rope used for scaffold suspension shall be capable of supporting at least 6 times the rated load.

(t) The use of shore or lean-to scaffolds is prohibited.

(u) The height of freestanding scaffold towers shall not exceed four times the minimum base dimension.

(v) Factory-built (laminated) scaffold planks meeting the requirements of wood scaffold planks may be substituted for wood scaffold planks.

(w) Materials being hoisted onto a scaffold shall have a tag line.

(x) Employees shall not work on scaffolds during storms or high winds.

(y) Tools, materials, and debris shall not be allowed to accumulate in quantities to cause a hazard.

(2) Wood pole scaffolds.

(a) Scaffold poles shall bear on a foundation of sufficient size and strength to spread the load from the pole over a sufficient area to prevent settlement. All poles shall be set plumb.

(b) Where wood poles are spliced, the ends shall be squared and the upper section shall rest squarely on the lower section. Wood splice plates shall be provided on at least two adjacent sides and shall be not less than 4 feet in length, overlapping the abutted ends equally, and have the same width and not less than the cross-sectional area of the pole. Splice plates or other materials of equivalent strength may be used.

(c) Independent pole scaffolds shall be set as near to the wall of the building as practicable.

(d) All pole scaffolds shall be securely guyed or tied to the building or structure. Where the height or length exceeds 25 feet, the scaffold shall be secured at intervals not greater than 25 feet vertically and horizontally.

(e) Putlogs or bearers shall be set with their greater dimension vertical, and long enough to project over the ledgers of the inner and outer rows of poles at least 3 inches for proper support.

(f) Every wooden putlog on single pole scaffolds shall be reinforced with a 3/16- x 2-inch steel strip, or equivalent, secured to its lower edge throughout its entire length.

(g) Ledgers shall be long enough to extend over two pole spaces. Ledgers shall not be spliced between the poles. Ledgers shall be reinforced by bearing blocks securely nailed to the side of the pole to form a support for the ledger.

(h) Diagonal bracing shall be provided to prevent the poles from moving in a direction parallel with the wall of the building, or from buckling

(i) Cross bracing shall be provided between the inner and outer sets of poles in independent pole scaffolds. The free ends of pole scaffolds shall be cross braced.

(j) Full diagonal face bracing shall be erected across the entire face of pole scaffolds in both directions. The braces shall be spliced only at the poles. The inner row of poles on medium and heavy duty scaffolds shall be braced in a similar manner.

(k) Platform planks shall be laid with their edges close together so the platform will be tight with no spaces through which tools or fragments of material can fall.

(l) Where planking is lapped, each plank shall lap its end supports at least 12 inches. Where the ends of planks abut each other to form a flush floor, the butt joint shall be at the centerline of a pole. The abutted ends shall rest on separate bearers. Intermediate beams shall be provided where necessary to prevent dislodgment of planks due to deflection, and the ends shall be secured to prevent their dislodgment.

(m) When a scaffold materially changes its direction, the platform planks shall be laid to prevent tipping. The planks that meet the corner putlog at an angle shall be laid first, extending over the diagonally placed putlog far enough to have a good safe bearing, but not far enough to involve any danger from tipping. The planking running in the opposite direction at an angle shall be laid so as to extend over and rest on the first layer of planking.

(n) When moving platforms to the next level, the old platform shall be left undisturbed until the new putlogs or

bearers have been set in place, ready to receive the platform planks.

(o) All wood pole scaffolds 60 feet or less in height shall be constructed and erected in accordance with Tables J-2 to J-8. If they are over 60 feet in height, they shall be designed by a qualified engineer competent in this field, and shall be constructed and erected in accordance with such design. Design drawings shall be available at the jobsite.

(3) Tube and coupler scaffolds.

(a) A light duty tube and coupler scaffold shall have all posts, bearers, runners, and bracing of nominal 2-inch O.D. steel tubing. The posts shall be spaced no more than 6 feet apart by 10 feet along the length of the scaffold. Other structural metals when used must be designed to carry an equivalent load. No dissimilar metals shall be used together.

(b) A medium duty tube and coupler scaffold shall have all posts, runners, and bracing of nominal 2-inch O.D. steel tubing. Posts spaced not more than 6 feet apart by 8 feet along the length of the scaffold shall have bearers of nominal 2 1/2-inch O.D. steel tubing. Posts spaced not more than 5 feet apart by 8 feet along the length of the scaffold shall have bearers of nominal 2-inch O.D. steel tubing. Other structural metals, when used, must be designed to carry an equivalent load. No dissimilar metals shall be used together.

(c) A heavy duty tube and coupler scaffold shall have all posts, runners, and bracing of nominal 2-inch O.D. steel tubing, with the posts spaced not more than 6 feet by 6 feet-6 inches. Other structural metals, when used, must be designed to carry an equivalent load. No dissimilar metals shall be used together.

(d) Tube and coupler scaffolds shall be limited in heights and working levels to those permitted in Tables J-8, J-9 and J-10. Drawings and specifications of all tube and coupler scaffolds above the limitations in Tables J-8, J-9 and J-10 shall be designed by a qualified engineer competent in this field. Design drawings shall be available at the jobsite.

(e) All tube and coupler scaffolds shall be constructed and erected to support four times the maximum intended loads, as set forth in Tables J-8, J-9 and J-10, or as set forth in the specifications by a licensed professional engineer competent in this field.

(f) Posts shall be accurately spaced, erected on suitable bases, and maintained plumb.

(g) Runners shall be erected along the length of the scaffold, located on both the inside and the outside posts at even height. Runners shall be interlocked to the inside and the outside posts at even heights. Runners shall be interlocked to form continuous lengths and coupled to each post. The bottom runners shall be located as close to the base as possible. Runners shall be placed not more than 6 feet-6 inches on centers. When tube and coupler guardrails and midrails are used on outside posts, they may be used in lieu of outside runners.

(h) Bearers shall be installed transversely between posts and shall be securely coupled to the posts with the inboard coupler bearing on the runner coupler. Where guardrails and midrails are required, no outboard runner is required.

(i) The length of the bearer shall exceed the post spacing of the width of the scaffold by the amount necessary to have full contact with the coupler. Bearers used to provide a cantilever support for use as brackets for light and

medium-duty scaffolds shall not carry more than two ten-inch planks unless knee braced.

(j) Bracing across the width of the scaffold shall be installed at the ends of the scaffold at least at every fourth level. Such bracing shall extend diagonally from the outer post or runner at this level upward to the inner post or runner at the next level.

(k) Longitudinal diagonal bracing shall be installed on the outer rows of poles at approximately forty degrees to fifty degrees angle from near the base of the first and last outer post upward to the top center of the scaffold. If the scaffold is long, the above diagonal bracing shall be repeated. On short but high runs, the diagonal bracing shall be installed at forty degrees to fifty degrees from the base of the first outer post to the last outer post alternating directions to the top of the scaffold. When conditions preclude the attachment of this bracing to the posts, it may be attached to the runners.

(l) When a scaffold exceeds either 30 feet horizontally or 26 feet vertically, the entire scaffold shall be tied to and securely braced against the building at intervals not to exceed 30 feet horizontally and 26 feet vertically.

(4) Fabricated tubular welded frame scaffolds.

(a) Metal tubular frame scaffolds, including accessories such as braces, brackets, trusses, screw legs, ladders, etc., shall safely support four times the maximum rated load. The maximum rated load shall not be exceeded.

(b) Spacing of panels or frames shall be consistent with the loads imposed.

(c) Scaffolds shall be properly braced by cross bracing or diagonal braces, or both, for securing vertical members together laterally, and the cross braces shall be of such length as will automatically square and aline vertical members so that the erected scaffold is always plumb, level, square, and rigid. All brace connections shall be made secure.

(d) Panel or frame legs shall be set on adjustable bases or plain bases placed on mud sills or other foundations adequate to support the maximum rated load.

(e) The panels or frames shall be placed one on top of the other with coupling or stacking pins to provide proper vertical alinement of the legs.

(f) Where uplift may occur, panels shall be locked together vertically by pins or equivalent method.

(g) To prevent movement, the scaffold shall be secured to the building or structure at intervals not to exceed 30 feet horizontally and 26 feet vertically.

(h) Maximum permissible spans or planking shall be in conformity with (1)(j) of this section.

(i) Fabricated tubular frame scaffolds over 125 feet in height above the base plates shall be designed by a registered professional engineer. Copies of the drawings and specifications shall be available at the jobsite.

(j) Guardrails, midrails, and toeboards shall be installed as required by subsection (1)(e) of this section. Wire mesh shall be provided between the top rail and toeboard when persons are working below.

(k) All fabricated tubular frame scaffolds shall be erected by competent and experienced personnel.

(l) All brackets shall be seated correctly with side brackets parallel to the frames and end brackets at ninety degrees to the frames. Brackets shall not be bent or twisted

from normal position. Brackets (except mobile brackets designed to carry materials) are to be used as work platforms only and shall not be used for storage of material or equipment.

(m) Scaffold frames and their components manufactured by different companies shall not be intermixed unless they are compatible and the manufacturer has given written approval. The manufacturer's letter of approval shall be available at the jobsite.

(n) Periodic inspections by the employer shall be made of all fabricated tubular frames and accessories. Any maintenance required shall be made before further use.

(5) Outrigger scaffolds, general.

(a) Outrigger beams shall extend not more than 6 feet beyond the face of the building. The inboard end of outrigger beams, measured from the fulcrum point to the inboard point of support, shall be not less than 1 1/2 times the outboard end in length. The beams shall rest on edge, the sides shall be plumb, and the edges shall be horizontal. The fulcrum point of the beam shall rest on a secure bearing at least 6 inches in each horizontal dimension. The beam shall be secured in place against movement and shall be securely braced at the fulcrum point against tipping.

(b) The inboard ends of outrigger beams shall be positively secured either by means of struts bearing against sills in contact with the overhead beams or ceiling, or by means of tension members secured to the floor joists underfoot, or by both if necessary, or by a securely fastened solid body counterweight. (Water in an open container or loose material in bags shall not be permitted.) The inboard ends of outrigger beams shall be secured against tipping and the entire supporting structure shall be securely braced in both directions to prevent any horizontal movement.

(c) Unless outrigger scaffolds are designed by a registered professional engineer competent in this field, they shall be constructed and erected in accordance with Table J-11. Outrigger scaffolds, designed by a registered professional engineer, shall be constructed and erected in accordance with such design. A copy of the drawings and specifications shall be available at the jobsite.

(d) Planking shall be laid tight and shall extend to within 3 inches of the building wall. Planking shall be secured to the beams.

(6) Masons' adjustable multiple-point suspension scaffolds.

(a) The scaffold shall be capable of sustaining a working load of 50 pounds per square foot and shall not be loaded in excess of that figure.

(b) The scaffold shall be provided with hoisting machines that meet the requirements of Underwriters' Laboratories, Factory Mutual Engineering Corporation, or other agency or laboratory approved by the department of labor and industries.

(c) The platform shall be supported by wire ropes, capable of supporting at least 6 times the intended load, suspended from overhead outrigger beams.

(d) The scaffold outrigger beams shall consist of structural metal securely fastened or anchored to the frame or floor system of the building or structure.

(e) Each outrigger beam shall be equivalent in strength to at least a standard 7-inch, 15.3-pound steel I-beam, at

least 15 feet long, and shall not project more than 6 feet 6 inches beyond the bearing point.

(f) Where the overhang exceeds 6 feet 6 inches, outrigger beams shall be composed of stronger beams or multiple beams and be installed under the supervision of a competent person.

(g) All outrigger beams shall be set and maintained with their webs in a vertical position.

(h) A stop bolt shall be placed at each end of every outrigger beam.

(i) The outrigger beam shall rest on suitable wood bearing blocks.

(j) The free end of the suspension wire ropes shall be equipped with proper size thimbles and secured by splicing or other equivalent means. The running ends shall be securely attached to the hoisting drum. At least four turns of wire rope shall remain on the drum when the platform is at ground level. The use of fiber rope is prohibited.

(k) Where a single outrigger beam is used, the steel shackles or clevises with which the wire ropes are attached to the outrigger beams shall be placed directly over the hoisting drums.

(l) The scaffold platform shall be equivalent in strength to at least 2-inch planking. (For maximum planking spans, see subsection (1)(j) of this section.)

(m) When employees are at work on the scaffold and an overhead hazard exists, overhead protection shall be provided on the scaffold, not more than 9 feet above the platform, consisting of 2-inch planking, or material of equivalent strength, laid tight, and extending not less than the width of the scaffold.

(n) Each scaffold shall be installed or relocated under the supervision of a competent person.

(o) When channel iron outrigger beams are used instead of I-beams, they shall be securely fastened together with the flanges turned out.

(p) All parts of the scaffold, such as bolts, nuts, fittings, clamps, wire rope, outrigger beams and their fastenings shall be maintained in sound condition and shall be inspected before each installation and periodically thereafter. All parts shall be of the grade specified by the manufacturer.

(7) Two-point suspension scaffolds.

(a) Two-point suspension scaffold platforms shall be not less than 20 inches nor more than 36 inches wide overall. The platform shall be securely fastened to the hangers by U-bolts or by other equivalent means.

(b) The hangers of two-point suspension scaffolds shall be made of wrought iron, mild steel, or other equivalent material, having a cross-sectional area capable of sustaining 4 times the maximum rated load, and shall be designed with a support for guardrail, intermediate rail, and toeboard.

(c) When hoisting machines are used on two-point suspension scaffolds, such machines shall be of a design tested and approved by Underwriters' Laboratories, Factory Mutual Engineering Corporation, or by an agency or laboratory approved by the department of labor and industries.

(d) The roof irons or hooks shall be of mild steel, or other equivalent material, of proper size and design, securely installed and anchored. The roof irons or hooks and any other devices shall have tiebacks of 3/4-inch manila rope, or the equivalent, to serve as a secondary means of anchorage, installed at right angles to the face of the building, whenever

possible, and secured to a structurally sound portion of the building.

(e) Two-point suspension scaffolds shall be suspended by wire, synthetic or fiber ropes capable of supporting at least 6 times the rated load. All other components shall be capable of supporting at least four times the rated load.

(f) The sheaves of all blocks, consisting of at least one double and one single block, shall fit the size and type of rope used and shall be a minimum of six inches in diameter.

(g) All wire ropes, fiber and synthetic ropes, slings, hangers, platforms, and other supporting parts shall be inspected before every installation. Periodic inspections shall be made while the scaffold is in use.

(h) On suspension scaffolds designed for a working load of 500 pounds, no more than two persons shall be permitted to work at one time. On suspension scaffolds with a working load of 750 pounds, no more than three persons shall be permitted to work at one time. On suspension scaffolds with a working load of 1,000 pounds, no more than four persons shall be permitted to work at one time. Each employee shall be protected by an approved full body harness attached to a dropline. The droplines shall be securely attached to substantial members of the structure (not scaffold), or to securely rigged lines, which will safely suspend the employee in case of a fall. In order to keep the dropline continuously attached, with a minimum of slack, to a fixed structure, the attachment point of the dropline shall be appropriately changed as the work progresses.

(i) When a multi-tiered two-point suspension scaffold is used, it shall be provided with safety droplines that attach to each end of the scaffold through an approved quick acting safety device, in case either or both of the main suspension lines should break. The lanyard of the full body harness shall be tied off to a substantial member of the scaffold itself or to a horizontal lifeline attached to each end of the scaffold or a sliding device on the horizontal lifeline. The two additional safety droplines shall be individually suspended from roof irons, hooks, or other approved devices and shall be near the suspension droplines to prevent unnecessary side impact. The safety dropline shall have a 6 to 1 safety factor. Such scaffolds shall be designed by a licensed professional engineer and a copy of the drawings and specifications shall be available at the jobsite.

(j) Two-point suspension scaffolds shall be securely lashed to the building or structure to prevent the scaffolds from swaying. Window cleaners' anchors shall not be used for this purpose.

(k) The platform of every two-point suspension scaffold shall be one of the following types:

(i) Ladder-type platforms. The side stringer shall be of clear straight-grained spruce or materials of equivalent strength and durability. The rungs shall be of straight-grained oak, ash, or hickory, at least 1 1/8 inch in diameter, with 7/8-inch tenons mortised into the side stringers at least 7/8-inch. The stringers shall be tied together with the tie rods not less than one-quarter inch in diameter, passing through the stringers and riveted up tight against washers on both ends. The flooring strips shall be spaced not more than five-eighths inch apart except at the side rails where the space may be 1 inch. Ladder-type platforms shall be constructed in accordance with Table J-12.

(ii) Plank-type platforms. Plank-type platforms shall be composed of not less than two nominal 2- x 10-inch unspliced planks, properly cleated together on the underside, starting 6 inches from each end; intervals in between shall not exceed 4 feet. The plank-type platform shall not extend beyond the hangers more than 12 inches. A bar or other effective means shall be securely fastened to the platform at each end to prevent its slipping off the hanger. The span between hangers for plank-type platforms shall not exceed 8 feet.

(iii) Beam-type platforms. Beam platforms shall have side stringers of lumber not less than 2 x 6 inches set on edge. The span between hangers shall not exceed 12 feet when beam platforms are used. The flooring shall be supported on 2- x 6-inch cross beams, laid flat and set into the upper edge of the stringers with a snug fit, at intervals of not more than 4 feet, securely nailed in place. The flooring shall be of 1- x 6-inch material properly nailed. Floor boards shall not be spaced more than one-half inch apart.

(iv) Light metal-type platforms, when used, shall be tested and listed according to Underwriters' Laboratories, Factory Mutual Engineering Corporation, or the department of labor and industries.

(l) In addition to the normal operating brake, all power-driven units shall have an emergency brake which engages automatically when the normal speed of descent is exceeded.

(m) When acid solutions are used, natural or synthetic fiber rope shall not be used.

(n) Every swinging scaffold shall be tested before using by raising the platform one foot from the ground and loading it with at least four times the maximum weight to be imposed when aloft.

(8) Stone setters' adjustable multiple-point suspension scaffolds.

(a) The scaffold shall be capable of sustaining a working load of 25 pounds per square foot and shall not be overloaded. Scaffolds shall not be used for storage of stone or other heavy materials.

(b) When used, the hoisting machine and its supports shall be of a type tested and listed by Underwriters' Laboratories, Factory Mutual Engineering Corporation or the department of labor and industries.

(c) The platform shall be securely fastened to the hangers by U-bolts or other equivalent means. (For materials and spans, see item (ii) of subsection (7)(k), Plank-type Platforms and Table J-12 of this section.)

(d) The scaffold unit shall be suspended from metal outriggers, iron brackets, wire rope slings, or iron hooks.

(e) Outriggers, when used, shall be set with their webs in a vertical position, securely anchored to the building or structure and provided with stop bolts at each end.

(f) The scaffold shall be supported by wire rope capable of supporting at least 6 times the rated load. All other components shall be capable of supporting at least 4 times the rated load.

(g) The free ends of the suspension wire ropes shall be equipped with proper size thimbles, secured by splicing or other equivalent means. The running ends shall be securely attached to the hoisting drum and at least four turns of wire rope shall remain on the drum at all times.

(h) When two or more scaffolds are used on a building or structure, they shall not be bridged one to the other; but

shall be maintained at even height with platforms abutting closely.

(i) In addition to the normal operating brake, all power-driven units shall have an emergency brake which engages automatically when the normal speed of descent is exceeded.

(j) Each scaffold shall be installed or relocated in accordance with approved designs and instructions under the supervision of a competent designated person.

(k) Where additional working levels are required to be supported, the plans and specifications of the support and scaffold components shall be designed by a licensed professional engineer. These plans and specifications shall be available at the site.

(9) Single-point adjustable suspension scaffolds.

(a) The scaffolding, including power units or manually operated winches, shall be of a type tested and listed by Underwriters' Laboratories, Factory Mutual Engineering Corporation or the department of labor and industries.

(b) The power units may be either electrically or air motor driven.

(c) All power-operated gears and brakes shall be enclosed.

(d) In addition to the normal operating brake, all power-driven units shall have an emergency brake which engages automatically when the normal speed of descent is exceeded.

(e) The hoisting machines, cables, and equipment shall be regularly serviced and inspected.

(f) The units may be combined to form a two-point suspension scaffold. Such scaffold shall comply with subsection (7) of this section.

(g) When the supporting wire rope is not plumb for its entire length, supports shall be designed to sustain any additional load or stress upon the line.

(h) Suspension methods and employee safeguards shall conform to the provisions of subsections (6) and (7) of this section.

(i) For additional details not covered in this subsection applicable technical portions of American National Standards Institute, A120.1-1970, Power-Operated Devices for Exterior Building Maintenance Powered Platforms, shall be used.

(10) Boatswain's chairs.

(a) The chair seat shall not be less than 12 x 24 inches, and 1-inch thick. The seat shall be reinforced on the underside by cleats securely fastened to prevent the board from splitting. Specially designed seats having dimensions other than those specified in this subsection may be used provided they have been designed and tested (with a safety factor of four) to sustain a load of two hundred fifty pounds.

(b) The two fiber rope seat slings shall be of 5/8-inch diameter, reeved through the four seat holes so as to cross each other on the underside of the seat.

(c) Seat slings shall be of at least 3/8-inch wire rope when an employee is conducting a heat-producing process, such as gas welding.

(d) The employee shall be protected by a full body harness and lifeline in accordance with chapter 296-155 WAC, Part C-1. The attachment point of the lifeline to the structure shall be appropriately changed as the work progresses.

(e) The tackle shall consist of correct size ball bearing or bushed blocks and properly spliced 5/8-inch diameter first grade manila rope, or equivalent.

(f) The roof irons, hooks, or the object to which the tackle is anchored, shall be securely installed. Tiebacks, when used, shall be installed at right angles to the face of the building and securely fastened.

(g) The scaffolding, including power units shall be of tested design.

(h) All power operated gears and brakes shall be enclosed.

(i) In addition to the normal operating brake, all power-driven units shall have an emergency brake which engages automatically when the normal speed of descent is exceeded.

(11) Carpenters' bracket scaffolds.

(a) The brackets shall consist of a triangular wood frame not less than 2 x 3 inches in cross section, or of metal of equivalent strength. Each member shall be properly fitted and securely joined.

(b) Each bracket shall be attached to the structure by means of one of the following:

(i) A bolt, no less than 5/8-inch in diameter, which shall extend through to the inside of the building wall;

(ii) A metal stud attachment device;

(iii) Welding to steel tanks;

(iv) Hooking over a well-secured and adequately strong supporting member.

(c) The brackets shall be spaced no more than 8 feet apart.

(d) No more than two employees shall occupy any given 8 feet of a bracket scaffold at any one time. Tools and materials shall not exceed 75 pounds in addition to the occupancy.

(e) The platform shall consist of not less than two 2-x 10-inch planks extending not more than 12 inches or less than 6 inches beyond each end support. Fabricated planking may be used if properly engineered and tested.

(12) Bricklayers' square scaffolds.

(a) The squares shall not exceed 5 feet in width and 5 feet in height.

(b) Members shall be not less than those specified in Table J-13.

(c) The squares shall be reinforced on both sides of each corner with 1-x 6-inch gusset pieces. They shall also have diagonal braces 1 x 8 inches on both sides running from center to center of each member, or other means to secure equivalent strength and rigidity.

(d) The squares shall be set not more than 5 feet apart for medium duty scaffolds, and not more than 8 feet apart for light duty scaffolds. Bracing, 1 x 8 inches, extending from the bottom of each square to the top of the next square, shall be provided on both front and rear sides of the scaffold.

(e) Platform planks shall be at least 2 x 10-inch. The ends of the planks shall overlap the bearers of the squares and each plank shall be supported by not less than three squares. Fabricated planking may be used if properly engineered and tested.

(f) Bricklayers' square scaffolds shall not exceed three tiers in height and shall be so constructed and arranged that one square shall rest directly above the other. The upper tiers shall stand on a continuous row of planks laid across the next lower tier and be nailed down or otherwise secured to prevent displacement.

(g) Scaffolds shall be level and set upon a firm foundation.

(13) Horse scaffolds.

(a) Horse scaffolds shall not be constructed or arranged more than two tiers or 10 feet in height.

(b) The members of the horses shall be not less than those specified in Table J-14.

(c) Horses shall be spaced not more than 5 feet for medium duty and not more than 8 feet for light duty.

(d) When arranged in tiers, each horse shall be placed directly over the horse in the tier below.

(e) On all scaffolds arranged in tiers, the legs shall be nailed down or otherwise secured to the planks to prevent displacement or thrust and each tier shall be substantially cross braced.

(f) Horses or parts which have become weak or defective shall not be used.

(14) Needle beam scaffold.

(a) Wood needle beams shall be not less than 4 x 6 inches in size, with the greater dimension placed in a vertical direction. Metal beams or the equivalent, conforming to subsections (1)(h) and (j) of this section, may be used and shall not be altered or moved horizontally while they are in use.

(b) Ropes or hangers shall be provided for supports. The span between supports on the needle beam shall not exceed 10 feet for 4- x 6-inch timbers. Rope supports shall be equivalent in strength to 1-inch diameter first-grade manila rope.

(c) The ropes shall be attached to the needle beams by a scaffold hitch or a properly made eye splice. The loose end of the rope shall be tied by a bowline knot or by a round turn and a half hitch.

(d) The scaffold hitch shall be arranged so as to prevent the needle beam from rolling or becoming otherwise displaced.

(e) The platform span between the needle beams shall not exceed 8 feet when using 2-inch scaffold plank. For spans greater than 8 feet, platforms shall be designed based on design requirements for the special span. The overhang of each end of the platform planks shall be not less than 6 inches and not more than 12 inches.

(f) When needle beam scaffolds are used, the planks shall be secured against slipping.

(g) All unattached tools, bolts, and nuts used on needle beam scaffolds shall be kept in suitable containers, properly secured.

(h) One end of a needle beam scaffold may be supported by a permanent structural member conforming to subsections (1)(h) and (j) of this section.

(i) Each employee working on a needle beam scaffold shall be protected by a full body harness and lifeline in accordance with chapter 296-155 WAC, Part C-1.

(15) Plasterers', decorators', and large area scaffolds.

(a) Plasters', lathers', and ceiling workers' inside scaffolds shall be constructed in accordance with the general requirements set forth for independent wood pole scaffolds. (See subsection (2) of this section and Tables J-5, J-6 and J-7.)

(b) All platform planks shall be laid with the edges close together.

(c) When independent pole scaffold platforms are erected in sections, such sections shall be provided with connecting runways equipped with substantial guardrails.

(16) Interior hung scaffolds.

(a) An interior hung scaffold shall be hung or suspended from the roof structure or ceiling beams.

(b) The suspending wire or fiber rope shall be capable of supporting at least 6 times the rated load. The rope shall be wrapped at least twice around the supporting members and twice around the bearers of the scaffold, with each end of the wire rope secured by at least three standard wire-rope clips properly installed.

(c) For hanging wood scaffolds, the following minimum nominal size material shall be used:

(i) Supporting bearers 2 x 10 inches on edge;

(ii) Planking 2 x 10 inches, with maximum span 7 feet for heavy duty and 10 feet for light duty or medium duty.

(d) Steel tube and coupler members may be used for hanging scaffolds with both types of scaffold designed to sustain a uniform distributed working load up to heavy duty scaffold loads with a safety factor of four.

(e) All overhead supporting members shall be inspected and have required strength assured before the scaffold is erected.

(17) Ladder jack scaffolds.

(a) All ladder jack scaffolds shall be limited to light duty and shall not exceed a height of 20 feet above the floor or ground.

(b) All ladders used in connection with ladder jack scaffolds shall be Type I heavy-duty ladders and shall be designed and constructed in accordance with American National Standards Institute A14.1-1982, Safety Code for Portable Wood Ladders, and A14.2-1982, Safety Code for Portable Metal Ladders. Cleated ladders shall not be used for this purpose.

(c) The ladder jack shall be so designed and constructed that it will bear on the side rails in addition to the ladder rungs, or if bearing on rungs only, the bearing area shall be at least 10 inches on each rung.

(d) Ladders used in conjunction with ladder jacks shall be so placed, fastened, held, or equipped with devices so as to prevent slipping.

(e) The wood platform planks shall be not less than 2 inches in thickness. Both metal and wood platform planks shall overlap the bearing surface not less than 12 inches and shall be secured to prevent movement. The span between supports for wood shall not exceed 8 feet. Platform width shall be not less than 18 inches.

(f) No more than two persons shall be within any 8 feet section of any ladder jack scaffold at any one time. When the use of standard guardrails as required by subsection (1)(e) of this section is impractical, full body harnesses and lifelines shall be used in accordance with chapter 296-155 WAC, Part C-1.

(18) Window jack scaffolds.

(a) Window jack scaffolds shall be used only for the purpose of working at the window opening through which the jack is placed.

(b) Window jacks shall not be used to support planks placed between one window jack and another or for other elements of scaffolding.

(c) Window jack scaffolds shall be provided with guardrails unless full body harnesses with lifelines are attached and used by the employee.

(d) Not more than one employee shall occupy a window jack scaffold at any one time.

(e) Window jacks shall be designed and constructed so as to provide a secure anchorage on the window opening and be capable of supporting the design load.

(19) Roofing brackets.

All roofing brackets must be installed and used in accordance with the requirements of chapter 296-155 WAC, Part K.

(20) Crawling boards or chicken ladders.

All crawling boards or chicken ladders shall be installed and used in accordance with the requirements of WAC 296-155-50503(3).

(21) Float or ship scaffolds.

(a) Float or ship scaffolds shall not be used to support more than three persons and a few light tools, such as those needed for riveting, bolting, and welding. They shall be constructed as designed in subdivisions (b) through (f) of this subsection, unless substitute designs and materials provide equivalent strength, stability, and safety.

(b) The platform shall be not less than 3 feet wide and 6 feet long, made of 3/4-inch plywood, equivalent to American Plywood Association Grade B-B, Group I, Exterior, or other similar material.

(c) Under the platform, there shall be two supporting bearers made from 2- x 4-inch, or 1- x 10-inch rough, "selected lumber," or better. They shall be free of knots or other flaws and project 6 inches beyond the platform on both sides. The ends of the platform shall extend 6 inches beyond the outer edges of the bearers. Each bearer shall be securely fastened to the platform.

(d) An edging of wood not less than 3/4 x 1 1/2 inches or equivalent shall be placed around all sides of the platform to prevent tools from rolling off.

(e) Supporting ropes shall be 1-inch diameter manila rope or equivalent, free from deterioration, chemical damage, flaws, or other imperfections and shall be well insulated to protect against damaging contacts of arcs, flames, or other mechanical objects. Rope connections shall be such that the platform cannot shift or slip. If two ropes are used with each float, they shall be arranged so as to provide four ends which are to be securely fastened to an overhead support. Each of the two supporting ropes shall be hitched around one end of bearer and pass under the platforms to the other end of the bearer where it is hitched again, leaving sufficient rope at each end for the supporting ties.

(f) Each employee shall be protected by an approved safety lifebelt or harness and lifeline, in accordance with chapter 296-155 WAC, Part C-1.

(22) Form scaffolds.

(a) Form scaffolds shall be constructed of wood or other suitable materials, such as steel or aluminum members of known strength characteristics. All scaffolds shall be designed and erected with a minimum safety factor of 4, computed on the basis of the maximum rated load.

(b) All scaffold planking shall be a minimum of 2- x 10-inch nominal scaffold grade, as recognized by approved grading rules for the species of lumber used, or equivalent material. Maximum permissible spans shall not

exceed 8 feet on centers for 2- x 10-inch nominal planking. Scaffold planks shall be either nailed or bolted to the ledgers or of such length that they overlap the ledgers at least 6 inches. Unsupported projecting ends of scaffolding planks shall be limited to a maximum overhang of 12 inches.

(c) Scaffolds shall not be loaded in excess of the working load for which they were designed.

(d) Figure-four form scaffolds:

(i) Figure-four scaffolds are intended for light duty and shall not be used to support loads exceeding 25 pounds per square foot unless specifically designed for heavier loading. For minimum design criteria, see Table J-15.

(ii) Figure-four form scaffold frames shall be spaced not more than 8 feet on centers and constructed from sound lumber, as follows: The outrigger ledger shall consist of two pieces of 1- x 6-inch or heavier material nailed on opposite sides of the vertical form support. Ledgers shall project not more than 3 feet 6 inches from the outside of the form support and shall be substantially braced and secured to prevent tipping or turning. The knee or angle brace shall intersect the ledger at least 3 feet from the form at an angle of approximately 45°, and the lower end shall be nailed to a vertical support. The platform shall consist of two or more 2- x 10-inch planks, which shall be of such length that they extend at least 6 inches beyond ledgers at each end unless secured to the ledgers. When planks are secured to the ledgers (nailed or bolted), a wood filler strip shall be used between the ledgers. Unsupported projecting ends of planks shall be limited to an overhang of 12 inches.

(e) Metal bracket form scaffolds:

(i) Metal brackets or scaffold jacks which are an integral part of the form shall be securely bolted or welded to the form. Folding type brackets shall be either bolted or secured with a locking-type pin when extended for use.

(ii) "Clip-on" or "hook-over" brackets may be used, provided the form walers are bolted to the form or secured by snap ties or shea-bolt extending through the form and securely anchored.

(iii) Metal brackets shall be spaced not more than 8 feet on centers.

(iv) Scaffold planks shall be either bolted to the metal brackets or of such length that they overlap the brackets at each end by at least 6 inches. Unsupported projecting ends of scaffold planks shall be limited to a maximum overhang of 12 inches.

(v) Metal bracket form scaffolds shall be equipped with wood guardrails, intermediate rails, toeboards, and scaffold planks meeting the minimum dimensions shown in Table J-16. (Metal may be substituted for wood, providing it affords equivalent or greater design strength.)

(f) Wooden bracket form scaffolds:

(i) Wooden bracket form scaffolds shall be an integral part of the form panel. The minimum design criteria set forth herein and in Table J-17 cover scaffolding intended for light duty and shall not be used to support loads exceeding 25 pounds per square foot, unless specifically designed for heavier loading.

(ii) Scaffold planks shall be either nailed or bolted to the ledgers or of such length that they overlap the ledgers at each end by at least 6 inches. Unsupported projecting ends of scaffold planks shall be limited to a maximum overhang of 12 inches.

(23) Pump jack scaffolds.

(a) Pump jack scaffolds shall:

- (i) Not carry a working load exceeding 500 pounds;
- (ii) Be capable of supporting without failure at least four times the maximum intended load; and
- (iii) Shall not have components loaded in excess of the manufacturer's recommended limits.

(b) Pump jack brackets, braces, and accessories shall be fabricated from metal plates and angles. Each pump jack bracket shall have two positive gripping mechanisms to prevent any failure or slippage.

(c) The platform bracket shall be fully docked and the planking secured. Planking, or equivalent, shall conform with subsection (1) of this section.

(d)(i) When wood scaffold planks are used as platforms, poles used for pump jacks shall not be spaced more than 10 feet center to center. When fabricated platforms are used that fully comply with all other provisions of this subsection, pole spacing may exceed 10 feet center to center.

(ii) Poles shall not exceed 30 feet in height.

(iii) Poles shall be secured to the work wall by rigid triangular bracing, or equivalent, at the bottom, top, and other points as necessary, to provide a maximum vertical spacing of not more than 10 feet between braces. Each brace shall be capable of supporting a minimum of 225 pounds tension or compression.

(iv) For the pump jack bracket to pass bracing already installed, an extra brace shall be used approximately 4 feet above the one to be passed until the original brace is reinstalled.

(e) All poles shall bear on mud sills or other adequate firm foundations.

(f) Pole lumber shall be two 2 x 4's, of Douglas fir or equivalent, straight-grained, clear, free of cross-grain, shakes, large loose or dead knots, and other defects which might impair strength.

(g) When poles are constructed of two continuous lengths, they shall be two by fours, spiked together with the seam parallel to the bracket, and with 10d common nails, no more than 12 inches center to center, staggered uniformly from opposite outside edges.

(h) If two by fours are spliced to make up the pole, the splices shall be so constructed as to develop the full strength of the member. Three-eighths inch or one-half inch exterior grade plywood shall be used for a spacer between the two by fours. The joints for the splices shall be staggered on opposite sides of the pole at least four feet apart. Joints shall be no less than four feet from either end of the pole.

(i) A ladder, in accordance with WAC 296-155-480, shall be provided for access to the platform during use.

(j) Not more than two persons shall be permitted at one time upon a pump jack scaffold between any two supports.

(k) Pump jack scaffolds shall be provided with standard guardrails, unless full body harnesses with lifelines are used by employees.

(l) When a work bench is used at an approximate height of 42 inches, the top guardrail may be eliminated, if the work bench is fully decked, the planking secured, and is capable of withstanding 200 pounds pressure in any direction.

(m) Employees shall not be permitted to use a work bench as a scaffold platform.

(24) Factory-built scaffold units. Factory-built or prefabricated scaffold units intended for assembly on the job, prefabricated plank, staging, etc., mechanical hoisting units, or other devices for use on or in connection with any type scaffolds, shall be approved by an agency or laboratory approved by the department before being used.

(25) Waler bracket scaffolds.

(a) Waler brackets shall be constructed of 1 5/8" x 1 1/2" x 3/16" angle iron minimum size, or material of equivalent strength.

(b) All steel connections shall be welded and riveted or bolted, except where detrimental to strength of materials.

(c) The maximum length of horizontal leg shall not be more than 36" between bracket hook and railing standard.

(d) A 4" x 4" x 3/16" gusset plate shall be securely welded at inside of leg angle.

(e) Nailing holes shall be provided in lower end of vertical leg for purpose of securing bracket against lifting or shifting.

(f) Waler hook or hooks shall be a minimum of 4-inch depth and be constructed of material of a strength to support a minimum of 400 pounds at extreme outer end of bracket.

(26) Chimney, stack and tank bracket scaffolds.

(a) General. A chimney, stack or tank bracket scaffold shall be composed of a platform supported by brackets which are hooked over a steel cable which surrounds the circumference of the chimney, stack or tank approximately in a horizontal plane. The platform shall be not less than two 2 x 10 inch planks. For a minimum width of eighteen inches wide and be designed with a safety factor of not less than 4.

(b) All brackets shall have a mild steel suspension hook 2 inches by 1/4-inch with at least 3 inches projecting beyond the throat of the hook. Hooks shall be integral with or securely attached to the bracket.

(c) Wood spacer blocks shall be provided to hold the suspending cable away from the structure at the points where brackets are hooked on. These spacer blocks shall be not less than 2 inches by 4 inches by 12 inches.

(d) All suspending cables shall be improved plow steel 6 x 19 wire rope or equivalent. In no case shall less than 1/2-inch diameter wire rope be used.

(e) The turnbuckle used to tighten suspending cables shall be not less than 1 inch drop forged steel. The cables shall be provided with thimbles and not less than 3 U-bolt type clips at each end and be attached to the turnbuckles by means of shackles. Open hooks shall not be used.

(f) All chimney, stack and tank bracket scaffolds shall be provided with standard guard rails, intermediate rails and toeboards.

(g) For access to a chimney, stack or tank bracket scaffold, ladders or a boatswain's chair shall be used.

(h) All chimney, stack or tank brackets for scaffolds shall be welded and riveted or bolted.

(27) Scaffold platforms supported by catenary or stretch cables.

(a) When a scaffold platform is supported by cables at least 4 cables shall be used, two near each end of the scaffold.

(b) The cables shall be attached to the scaffold by means of U-bolts or the equivalent through which the cables pass.

(c) Cables shall not be tightened beyond their safe working load. A hanger or set of falls shall be used approximately every 50 feet to pick up the sag in the cable.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-24-051, § 296-155-485, filed 11/27/96, effective 2/1/97. Statutory Authority: Chapter 49.17 RCW. 95-10-016, § 296-155-485, filed 4/25/95, effective 10/1/95; 94-15-096 (Order 94-07), § 296-155-485, filed 7/20/94, effective 9/20/94; 91-24-017 (Order 91-07), § 296-155-485, filed 11/22/91, effective 12/24/91; 91-03-044 (Order 90-18), § 296-155-485, filed 1/10/91, effective 2/12/91; 90-03-029 (Order 89-20), § 296-155-485, filed 1/11/90, effective 2/26/90. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-485, filed 1/21/86; 82-08-026 (Order 82-10), § 296-155-485, filed 3/30/82. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240. 79-08-115 (Order 79-9), § 296-155-485, filed 7/31/79; Order 76-29, § 296-155-485, filed 9/30/76; Order 76-6, § 296-155-485, filed 3/1/76; Order 74-26, § 296-155-485, filed 5/7/74, effective 6/6/74.]

WAC 296-155-48503 Table J-1.

TABLE J-1
MATERIAL

	Full Thickness undressed lumber		Nominal thickness lumber ¹	
Working load (p.s.f.)	25	50	75	50
Permissible span (ft.)	10	8	6	8

¹ Nominal thickness lumber not recommended for heavy duty use.

[Order 76-29, Table J-1 (codified as WAC 296-155-48503), filed 9/30/76; Order 74-26, § 296-155-485 (part), Table J-1, filed 5/7/74, effective 6/6/74.]

WAC 296-155-48504 Table J-2.

TABLE J-2
MINIMUM NOMINAL SIZE AND MAXIMUM SPACING OF MEMBERS OF SINGLE POLE SCAFFOLDS, LIGHT DUTY

	Maximum height of scaffold	
	20 ft.	60 ft.
Uniformly distributed load	Not to exceed 25 p.s.f.	
Poles or uprights	2 x 4 in.	4 x 4 in.
Pole spacing (longitudinal)	6 ft. 0 in.	10 ft. 0 in.
Maximum width of scaffold	5 ft. 0 in.	5 ft. 0 in.
Bearers or putlogs to 3 ft. 0 in. width	2 x 4 in.	2 x 4 in.
Bearers or putlogs to 5 ft. 0 in. width	2 x 6 in. or 3 x 4 in.	2 x 6 in. or 3 x 4 in. (rough)
Ledgers	1 x 4 in.	1 3/4 x 9 in.
Planking	1 1/4 x 9 in. (rough)	2 x 10 in.
Vertical spacing of horizontal members	7 ft. 0 in.	

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Bracing, horizontal and diagonal	1 x 4 in.	1 x 4 in.
Tie-ins	1 x 4 in.	1 x 4 in.
Toeboards	4 in. high (minimum)	4 in. high (minimum)
Guardrail	2 x 4 in.	2 x 4 in.

All members except planking are used on edge.

[Order 76-29, Table J-2 (codified as WAC 296-155-48504), filed 9/30/76; Order 74-26, § 296-155-485 (part), Table J-2, filed 5/7/74, effective 6/6/74.]

WAC 296-155-48505 Table J-3.

TABLE J-3
MINIMUM NOMINAL SIZE AND MAXIMUM SPACING OF MEMBERS OF SINGLE POLE SCAFFOLDS—MEDIUM DUTY

Uniformly distributed load	Not to exceed 50 p.s.f.	
Maximum height of scaffold	60 ft.	
Poles or uprights	4 x 4 in.	
Pole spacing (longitudinal)	8 ft. 0 in.	
Maximum width of scaffold	5 ft. 0 in.	
Bearers or putlogs	2 x 10 in. or 3 x 4 in.	
Spacing of bearers or putlogs	8 ft. 0 in.	
Ledgers	2 x 10 in.	
Vertical spacing of horizontal members	7 ft. 0 in.	
Bracing, horizontal and diagonal	1 x 6 in. or 1 1/4 x 4 in.	
Tie-ins	1 x 4 in.	
Planking	2 x 10 in.	
Toeboards	4 in. high (minimum)	
Guardrail	2 x 4 in.	

All members except planking are used on edge.

[Order 76-29, Table J-3 (codified as WAC 296-155-48505), filed 9/30/76; Order 74-26, § 296-155-485 (part), Table J-3, filed 5/7/74, effective 6/6/74.]

WAC 296-155-48506 Table J-4.

TABLE J-4
MINIMUM NOMINAL SIZE AND MAXIMUM SPACING OF MEMBERS OF SINGLE POLE SCAFFOLDS—HEAVY DUTY

Uniformly distributed load	Not to exceed 75 p.s.f.	
Maximum height of scaffold	60 ft.	
Poles or uprights	4 x 6 in.	
Pole spacing (longitudinal)	6 ft. 0 in.	
Maximum width of scaffold	5 ft. 0 in.	
Bearers or putlogs	2 x 10 in. or 3 x 5 in.	
Spacing of bearers or putlog	6 ft. 0 in.	
Ledgers	2 x 10 in.	
Vertical spacing of horizontal members	6 ft. 6 in.	
Bracing, horizontal and diagonal	2 x 4 in.	
Tie-ins	1 x 4 in.	
Planking	2 x 10 in.	
Toeboards	4 in. high (minimum)	
Guardrail	2 x 4 in.	

All members except planking are used on edge.

[Order 76-29, Table J-4 (codified as WAC 296-155-48506), filed 9/30/76; Order 74-26, § 296-155-485 (part), Table J-4, filed 5/7/74, effective 6/6/74.]

WAC 296-155-48507 Table J-5.

TABLE J-5
MINIMUM NOMINAL SIZE AND
MAXIMUM SPACING
OF MEMBERS OF INDEPENDENT POLE
SCAFFOLD—LIGHT DUTY

	Maximum height of scaffold	
	20 ft.	60 ft.
Uniformly distributed load	Not to exceed 25 p.s.f.	
Poles or uprights	2 x 4 in.	4 x 4 in.
Pole spacing (longitudinal)	6 ft. 0 in.	10 ft. 0 in.
Pole spacing (transverse)	6 ft. 0 in.	10 ft. 0 in.
Ledgers	1 1/4 x 4 in.	1 1/4 x 9 in.
Bearers to 3 ft. 0 in. span	2 x 4 in.	2 x 4 in.
Bearers to 10 ft. 0 in. span	2 x 6 in. or 3 x 4 in.	2 x 10 in. (rough) or 3 x 8 in.
Planking	1 1/4 x 9 in.	2 x 10 in.
Vertical spacing of horizontal members	7 ft. 0 in.	7 ft. 0 in.
Bracing, horizontal and diagonal	1 x 4 in.	1 x 4 in.
Tie-ins	1 x 4 in.	1 x 4 in.
Toeboards	4 in. high	4 in. high (minimum)
Guardrail	2 x 4 in.	2 x 4 in.

All members except planking are used on edge.

[Order 76-29, Table J-5 (codified as WAC 296-155-48507), filed 9/30/76; Order 74-26, § 296-155-485 (part), Table J-5, filed 5/7/74, effective 6/6/74.]

WAC 296-155-48508 Table J-6.

TABLE J-6
MINIMUM NOMINAL SIZE AND
MAXIMUM SPACING
OF MEMBERS OF INDEPENDENT POLE
SCAFFOLD—MEDIUM DUTY

Uniformly distributed load	Not to exceed 50 p.s.f.
Maximum height of scaffold	60 ft.
Poles or uprights	4 x 4 in.
Pole spacing (longitudinal)	8 ft. 0 in.
Pole spacing (transverse)	8 ft. 0 in.
Ledgers	2 x 10 in.
Vertical spacing of horizontal members	6 ft. 0 in.
Spacing of bearers	8 ft. 0 in.
Bearers	2 x 10 in.
Bracing, horizontal	1 x 6 in. or 1 1/4 x 4 in.
Bracing, diagonal	1 x 4 in.
Tie-ins	1 x 4 in.
Planking	2 x 10 in.
Toeboards	4 in. high (minimum)
Guardrail	2 x 4 in.

All members except planking are used on edge.

[Order 76-29, Table J-6 (codified as WAC 296-155-48508), filed 9/30/76; Order 74-26, § 296-155-485 (part), Table J-6, filed 5/7/74, effective 6/6/74.]

WAC 296-155-48509 Table J-7.

TABLE J-7
MINIMUM NOMINAL SIZE AND
MAXIMUM SPACING
OF MEMBERS OF INDEPENDENT POLE
SCAFFOLDS—HEAVY DUTY

Uniformly distributed load	Not to exceed 74 p.s.f.
Maximum height of scaffold	60 ft.
Poles or uprights	4 x 4 in.
Pole spacing (longitudinal)	6 ft. 0 in.
Pole spacing (transverse)	8 ft. 0 in.
Ledgers	2 x 10 in.
Vertical spacing of horizontal members	6 ft. 0 in.
Bearers	2 x 10 in. (rough)
Bracing, horizontal and diagonal	2 x 4 in.
Tie-ins	1 x 4 in.
Planking	2 x 10 in.
Toeboards	4 in. high (minimum)
Guardrail	2 x 4 in.

All members except planking are used on edge.

[Order 76-29, Table J-7 (codified as WAC 296-155-48509), filed 9/30/76; Order 74-26, § 296-155-485 (part), Table J-7, filed 5/7/74, effective 6/6/74.]

WAC 296-155-48510 Table J-8.

TABLE J-8
TUBE AND COUPLER SCAFFOLDS LIGHT DUTY

Uniformly distributed load	Not to exceed 25 p.s.f.
Post spacing (longitudinal)	10 ft. 0 in.
Post spacing (transverse)	6 ft. 0 in.

Working Levels	Additional planked levels	Maximum height
1	8	125 ft.
2	4	125 ft.
3	10	91 ft. 0 in.

[Order 76-29, Table J-8 (codified as WAC 296-155-48510), filed 9/30/76; Order 74-26, § 296-155-485 (part), Table J-8, filed 5/7/74, effective 6/6/74.]

WAC 296-155-48511 Table J-9.

TABLE J-9
TUBE AND COUPLER SCAFFOLDS MEDIUM DUTY

Uniformly distributed load	Not to exceed 50 p.s.f.
Post spacing (longitudinal)	8 ft. 0 in.
Post spacing (transverse)	6 ft. 0 in.

Working Levels	Additional planked levels	Maximum height
1	6	125 ft.
2	0	78 ft. 0 in.

[Order 76-29, Table J-9 (codified as WAC 296-155-48511), filed 9/30/76; Order 74-26, § 296-155-485 (part), Table J-9, filed 5/7/74, effective 6/6/74.]

WAC 296-155-48512 Table J-10.

TABLE J-10

TUBE AND COUPLER SCAFFOLDS HEAVY DUTY

Uniformly distributed load ————— Not to exceed 75 p.s.f.
 Post spacing (longitudinal) ————— 6 ft. 6 in.
 Post spacing (transverse) ————— 6 ft. 0 in.

Working Levels	Additional planked levels	Maximum height
1	6	125 ft.

[Order 76-29, Table J-10 (codified as WAC 296-155-48512), filed 9/30/76; Order 74-26, § 296-155-485 (part), Table J-10, filed 5/7/74, effective 6/6/74.]

WAC 296-155-48513 Table J-11.

TABLE J-11

MINIMUM NOMINAL SIZE AND MAXIMUM SPACING OF MEMBERS OF OUTRIGGER SCAFFOLDS

Maximum scaffold load	Light duty	Medium duty
	25 p.s.f.	50 p.s.f.
Outrigger size	2 x 10 in.	3 x 10 in.
Maximum outrigger spacing	10 ft. 0 in.	6 ft. 0 in.
Planking	2 x 10 in.	2 x 10 in.
Guardrail	2 x 4 in.	2 x 4 in.
Guardrail uprights	2 x 4 in.	2 x 4 in.
Toeboards	4 in.	4 in.
	(minimum)	(minimum)

[Order 76-29, Table J-11 (codified as WAC 296-155-48513), filed 9/30/76; Order 74-26, § 296-155-485 (part), Table J-11, filed 5/7/74, effective 6/6/74.]

WAC 296-155-48514 Table J-12.

TABLE J-12

SCHEDULE FOR LADDER TYPE PLATFORMS

TABLE J-12—PART I

	Length of platform (feet)		
	12	14 and 16	18 and 20
Side stringers, minimum cross section (finished sizes):			
At ends (inches)	1 3/4 x 2 3/4	1 3/4 x 2 3/4	1 3/4 x 3
At middle (inches)	1 3/4 x 3 3/4	1 3/4 x 3 3/4	1 3/4 x 4

Side stringers, minimum cross section (finished sizes):
 At ends (inches) 1 3/4 x 2 3/4 1 3/4 x 2 3/4 1 3/4 x 3
 At middle (inches) 1 3/4 x 3 3/4 1 3/4 x 3 3/4 1 3/4 x 4

Reinforcing strip (minimum)	A 1/8 x 7/8-inch steel reinforcing strip or its equivalent shall be attached to the side or underside full length.		
Rungs	Rungs shall be 1 1/8-inches minimum diameter with at least 7/8-inch diameter tenons, and the maximum spacing shall be 12 inches center to center.		
Tie rods:			
Number (minimum)	3	4	4
Diameter (minimum)	1/4 in.	1/4 in.	1/4 in.
Flooring, minimum finished size (inches)	1/2 x 2 3/4	1/2 x 2 3/4	1/2 x 2 3/4

TABLE J-12—PART II

	Length of platform (feet)	
	22 and 24	28 and 30
Side stringers, minimum cross section (finished sizes):		
At ends (inches)	1 3/4 x 3	1 3/4 x 3 1/2
At middle (inches)	1 3/4 x 4 1/4	1 3/4 x 5
Reinforcing strip (minimum)	A 1/8 x 7/8-inch steel reinforcing strip or its equivalent shall be attached to the side or underside full length.	
Rungs	Rungs shall be 1 1/8-inches minimum diameter with at least 7/8-inch diameter tenons, and the maximum spacing shall be 12 inches center to center.	
Tierods:		
Number (minimum)	5	6
Diameter (minimum)	1/4 in.	1/4 in.
Flooring, minimum finished size (inches)	1/2 x 2 3/4	1/2 x 2 3/4

[Order 76-29, Table J-12 (codified as WAC 296-155-48514), filed 9/30/76; Order 74-26, § 296-155-485 (part), Table J-12, filed 5/7/74, effective 6/6/74.]

WAC 296-155-48515 Table J-13.

TABLE J-13

MINIMUM DIMENSIONS FOR BRICKLAYERS' SQUARE SCAFFOLD MEMBERS

Members	Dimensions
Bearers or horizontal members	2 x 6 in.
Legs	2 x 6 in.
Braces at corners	1 x 6 in.
Braces diagonally from center frame	1 x 8 in.

[Order 76-29, Table J-13 (codified as WAC 296-155-48515), filed 9/30/76; Order 74-26, § 296-155-485 (part), Table J-13, filed 5/7/74, effective 6/6/74.]

WAC 296-155-48516 Table J-14.

TABLE J-14

MINIMUM DIMENSIONS FOR HORSE SCAFFOLD MEMBERS

Members	Dimensions
Horizontal members or bearers	3 x 4 in.
Legs	1 1/4 x 4 1/2 in.
Longitudinal brace between legs	1 x 6 in.
Gusset brace at top of legs	1 x 8 in.
Half diagonal braces	1 1/4 x 4 1/2 in.

[Order 76-29, Table J-14 (codified as WAC 296-155-48516), filed 9/30/76; Order 74-26, § 296-155-485 (part), Table J-14, filed 5/7/74, effective 6/6/74.]

WAC 296-155-48517 Table J-15.

TABLE J-15

MINIMUM DESIGN CRITERIA FOR FIGURE-FOUR FORM SCAFFOLDS

Members	Dimension
Uprights	2 x 4 in. or 2 x 6 in.
Outriggers ledgers (two)	1 x 6 in.
Braces	1 x 6 in.
Guardrails	2 x 4 in.
Guardrail height	Approximately 42 in.
Intermediate guardrails	1 x 6 in.
Toeboards	4 in. (minimum).
Maximum length of ledgers	3 ft. 6 in. (unsupported).
Planking	2 x 10 in.
Upright spacing	8 ft. 0 in. (on centers).

[Order 76-29, Table J-15 (codified as WAC 296-155-48517), filed 9/30/76; Order 74-26, § 296-155-485 (part), Table J-15, filed 5/7/74, effective 6/6/74.]

WAC 296-155-48518 Table J-16.

TABLE J-16

MINIMUM DESIGN CRITERIA FOR METAL BRACKET FORM SCAFFOLDS

Members	Dimensions
Uprights	2 x 4 in.
Guardrails	2 x 4 in.
Guardrail height	Approximately 42 in.
Intermediate guardrails	1 x 6 in.
Toeboards	4 in. (minimum)
Planking	2 x 9 in.

[Order 76-29, Table J-16 (codified as WAC 296-155-48518), filed 9/30/76; Order 74-26, § 296-155-485 (part), Table J-16, filed 5/7/74, effective 6/6/74.]

WAC 296-155-48519 Table J-17.

TABLE J-17

MINIMUM DESIGN CRITERIA FOR WOODEN BRACKET FORM SCAFFOLDS

Members	Dimensions
Uprights	2 x 4 in. or 2 x 6 in.
Support ledgers	2 x 6 in.
Maximum scaffold width	3 ft. 6 in.
Braces	1 x 6 in.
Guardrails	2 x 4 in.
Guardrail height	Approximately 42 in.
Intermediate guardrail	1 x 6 in.

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Toeboards	4 in. (minimum).
Upright spacing	8 ft. 0 in. (on centers).

[Order 76-29, Table J-17 (codified as WAC 296-155-48519), filed 9/30/76; Order 74-26, § 296-155-485 (part), Table J-17, filed 5/7/74, effective 6/6/74.]

WAC 296-155-48523 Manually propelled mobile ladder stands and scaffolds (towers). (1) All applicable rules for design, construction, maintenance, operation, testing, and use of manually propelled mobile ladder stands and scaffolds (towers) shall be in accordance with ANSI A92.1-1977.

(2) General and design requirements: Stands and scaffolds of this section shall meet the requirements specified:

(a) The design working load of ladder stands shall be calculated on the basis of one or more two hundred fifty-pound persons together with fifty pounds of equipment each.

(b) The design working load of all scaffolds shall be calculated on the basis of:

- (i) LIGHT - Designed and constructed to carry a working load of 25 lb/ft²
- (ii) MEDIUM - Designed and constructed to carry a working load of 50 lb/ft²
- (iii) HEAVY - Designed and constructed to carry a working load of 75 lb/ft²

(c) All ladder stands and scaffolds shall be capable of supporting at least four times the design working load.

(d) The materials used in mobile ladder stands and scaffolds shall be of standard manufacture and conform to standard specifications of strength, dimensions, and weights, and shall be selected to safely support the design working load.

(e) Nails, bolts, weldments, or other mechanical fasteners used in the construction of ladders, scaffolds, and towers shall be of adequate size and in sufficient numbers at each connection to develop the designed strength of the unit. Nails shall be driven full length and all exposed surfaces shall be free from sharp edges, burrs, or other safety hazards.

(f) The maximum work level height shall not exceed four times the minimum or least base dimension of any mobile ladder stand or scaffold. Where the basic mobile unit does not meet this requirement, outrigger frames shall be employed to achieve this least base dimension, or provisions shall be made to guy or brace the unit against tipping.

(g) The minimum platform width for any work level shall not be less than eighteen inches for mobile scaffolds (towers).

(h) Ladder stands shall have a minimum step width of sixteen inches.

(i) The supporting structure for the work level shall be rigidly braced, using cross bracing, diagonal bracing, knee braces, or the equivalent, with rigid platforms or steps at each work level.

(j) The steps and platform of ladder stands and scaffolds shall be fabricated from slip-resistant materials.

(k) The work level platform of scaffolds (towers) shall be made of wood, aluminum, or plywood planking, steel, or expanded metal, for the full width of the scaffold, except for necessary openings.

- (i) Work platforms shall be secured in place.
- (ii) The clearances between adjacent platform boards or scaffold members, or both, shall not exceed one inch.
- (iii) All planking shall be two inch (nominal) scaffold grade minimum 1500 lbf/in² (stress grade) construction grade lumber, or the equivalent.
- (l) All scaffold and ladder stand platform work levels ten feet or higher above the ground or floor shall have a standard (1 x 4 lumber nominal or the equivalent) toeboard.
- (m) All scaffold and ladder stand platform work levels with platform height of four feet or greater shall be provided with guardrails and midrails on exposed sides and end wherever the horizontal dimension of the platform in either direction is less than forty-five inches.
- (n) All scaffold and ladder stand platform work levels ten feet or higher above the ground or floor shall be provided with standard guardrails.
- (o) A climbing ladder or stairway shall be provided for proper access and egress, and shall be affixed or built into the scaffold and so located that its use will not have a tendency to tip the scaffold.
- (p) Where the horizontal members of the scaffold frame are spaced not more than sixteen inches apart, and a standard guardrail has been provided on the scaffold platform to serve as handholds during access to the platform, persons may use the scaffold frames for access and exit, provided that scaffold platform does not project beyond the bearer.
- (q) Wheels or casters, when under load, shall be properly designed for strength and dimensions to support four times the design working load.
- (i) All scaffold casters shall be provided with a positive wheel or swivel lock, or both, to prevent movement.
- (ii) Ladder stands shall have at least two locking casters or other means of locking the unit in position.
- (iii) Swivel casters, if used, shall be provided with a positive lock.
- (iv) Where leveling of the elevated work platform is required, screw jacks or other suitable means for adjusting the height shall be provided in the base section of each mobile unit.
- (3) Mobile tubular fabricated frame scaffolds: Mobile tubular fabricated frame scaffolds shall be designed to comply with the requirements of subsections (1) through (2)(q) of this section.
 - (a) Scaffolds shall be braced by cross braces or diagonal braces, or both, for securing vertical members together laterally.
 - (b) The cross braces shall be of a length that will automatically square and align vertical members so that the erected scaffold is always plumb, square, and rigid.
 - (c) Spacing of panels of frames shall be consistent with the loads imposed.
 - (d) The frames shall be placed one on top of the other with coupling or stacking pins to provide vertical alignment of the legs.
 - (e) Where uplift may occur, panels shall be locked together vertically by pins or other equivalent means.
 - (f) Only the manufacturer of the scaffold or the manufacturer's qualified designated agent shall be permitted to erect or supervise the erection of scaffolds exceeding fifty feet in height above the base, unless:
 - (i) Such structure is approved in writing by a licensed professional engineer;
 - (ii) Erected in accordance with instructions furnished by the manufacturer.
- (4) Mobile tubular fabricated sectional folding scaffolds: Mobile tubular fabricated sectional folding scaffolds, including sectional stairway and sectional ladder scaffolds, shall be designed to comply with the requirements of subsections (1) through (2)(q) of this section.
 - (a) An integral stairway and work platform shall be incorporated into the structure of each sectional folding stairway scaffold.
 - (b) An integral set of pivoting and hinged folding diagonal and horizontal braces and a detachable work platform shall be incorporated into the structure of each sectional folding ladder scaffold.
 - (c) The end frames of sectional ladder and stairway scaffolds shall be designed so that the horizontal bearers provide supports for multiple planking levels.
 - (d) Only the manufacturer of the scaffold or the qualified designated agent shall be permitted to erect or supervise the erection of scaffolds exceeding fifty feet in height above the base, unless:
 - (i) Such structure is approved in writing by a licensed professional engineer;
 - (ii) Erected in accordance with instructions furnished by the manufacturer.
- (5) Mobile tube and coupler scaffolds: Mobile tube and coupler scaffolds shall be designed to comply with the requirements of subsections (1) through (2)(q) of this section.
 - (a) The material used for the couplers shall be of a structural type, such as a drop-forged steel, malleable iron, or structural grade aluminum.
 - (b) The use of gray cast iron is prohibited.
 - (c) Only the manufacturer of the scaffold or the qualified designated agent shall be permitted to erect or supervise the erection of scaffolds exceeding fifty feet in height above the base, unless:
 - (i) Such structure is approved in writing by a qualified engineer.
 - (ii) Erected in accordance with instructions furnished by the manufacturer.
- (6) Mobile work platforms: Mobile work platforms shall be designed for the use intended and shall comply with the requirements of subsections (1) through (2)(q) of this section.
 - (a) The minimum width of the base of mobile work platforms shall not be less than eighteen inches.
 - (b) Adequate rigid bracing to vertical members shall be provided.
- (7) Mobile ladder stands: Mobile ladder stands shall comply with applicable requirements of subsections (1) through (2)(q) of this section.
 - (a) The minimum base width shall conform to subsection (2)(f) of this section.
 - (b) The minimum length of the base section shall be the total length of combined steps and top assembly, measured horizontally, plus five-eighths inch per step of rise.
 - (c) Steps shall be uniformly spaced and sloped, with a rise of not less than nine inches or more than ten inches and a depth of not less than seven inches.

(d) The slope of the steps shall be a maximum of sixty degrees measured from the horizontal.

(e) Units having more than four steps shall be equipped with handrails.

(i) Handrails shall be a minimum of thirty inches plus or minus one inch in height.

(ii) Measurements shall be taken vertically from the center of the step.

(f) The load shall be applied uniformly to a three and one-half inch wide area front to back at the center of the width span with a safety factor of four.

(8) Scaffold and ladder stands: Scaffolds and ladder stands shall be furnished, where ladders or other equipment are not deemed appropriate, and erected in accordance with this standard for persons engaged in work that cannot be done safely from the ground or from solid construction, and where it is desired to facilitate relocation of the unoccupied units without disassembly.

(a) Persons shall be prohibited from riding on units while they are being moved, and materials, tools, or equipment shall not be stored on the units while they are being moved except under strict compliance with the provisions following, and only with extreme care and caution exercised by the user.

(b) Guardrails, midrails, and toeboards shall be installed as required by subsection (2)(l), (m) and (n) of this section.

(c) The floor or surface shall be within three degrees of level, smooth (the equivalent of broom-finished concrete), and free from pits, holes, or obstructions.

(d) The minimum dimension of the scaffold base when ready for rolling shall be at least one-half of the height.

(e) Outriggers, if used, shall be installed on all four sides of the scaffold and then can be included as a part of the base dimension.

(f) All tools or materials, or both, shall be secured or removed from the platform before the mobile scaffold is moved.

(g) Employees on the mobile scaffold shall be advised and be aware of each movement in advance.

(h) Employees on the work platform of the mobile scaffold may move the scaffold when the mobile scaffold is equipped with a manual system in which the propelling force is applied to the wheels only and cannot exceed normal walking speed.

(i) The force necessary to move the mobile scaffold shall be applied as close to the base as practicable, and provision shall be made to stabilize the tower during movement from one location to another.

(j) The vertical posts of frames shall be accurately spaced and rest upon suitable footing capable of carrying the maximum design load without settling or displacement. They shall be plumb, and securely and rigidly braced to prevent swaying and displacement.

(k) Where leveling of the mobile scaffold platform is required, screw jacks or other means for adjusting the height shall be provided in each leg section of each mobile unit.

(i) At least six inches of the screw jack shall be in the scaffold leg.

(ii) The screw jack shall not be extended more than twelve inches.

(l) Units shall be erected, used, and disassembled in accordance with instructions furnished by the manufacturer.

(m) Scaffolds shall be erected and used only by personnel who have been trained in their erection.

(n) Units shall be inspected before and after use.

(o) Units shall not be loaded in excess of the design working load.

(p) Units shall be repaired immediately when damaged or weakened from any cause.

(q) They shall not be used until repairs are completed.

(r) Units shall not be altered while they are in use or occupied.

(s) They shall be securely locked to prevent movement while occupied.

(t) Overhead protection shall be provided for the work platform, consisting of two-inch (nominal) planking, or the equivalent, not more than nine feet above the platform when an overhead hazard exists to the user on the platform.

(u) Ladders or unstable objects shall not be placed on top of rolling scaffolds to gain greater height.

(v) Persons shall not work on scaffolds during high winds, storms, or when the scaffolds are covered with ice or snow until all the ice and snow has been removed and the platform is sanded.

(w) Persons climbing or descending scaffold ladders shall have both hands free for climbing and shall remove foreign substances, such as, but not limited to, mud or grease from their shoes.

(x) Where moving vehicles are present, the scaffold area shall be marked with warnings, such as, but not limited to, flags, roped off areas, and barricades.

(y) Unstable objects such as barrels, boxes, loose brick, tools, and debris shall not be allowed to accumulate on the work level.

(z) In operations involving production of small debris, chips, etc., and the use of small tools and materials, and where persons are required to work or pass under the equipment, screens shall be required and properly secured between toeboards and guardrails. The screen shall extend along the entire opening, and shall consist of No. 19 gauge U.S. standard wire one-half inch mesh, or the equivalent.

(9) Required markings and data plates. Each unit shall be marked with the manufacturer's or vendor's name or identification symbol and rated working load, and shall indicate conformance to ANSI A92.1-1977 or a revision thereof.

(a) These markings shall be either stamped into a metal component of the unit, or provided on a metal name plate, or equivalent durable label, permanently secured to the unit.

(b) Precautionary labels or signs shall be permitted to warn of common hazards anticipated with the use of specific products, such as electrical hazards and contact with corrosive substances.

(c) Additional items for labeling consideration are inspection, proper selection, setup, climbing instructions, storage and care, and other instructions as deemed necessary.

(d) The precautionary labels or signs shall conform to the requirements of ANSI Specifications for Accident Prevention Signs, ANSI Z35.1-1972, and ANSI Specifications for Informational Signs Complementary to Accident Prevention Signs, ANSI Z35.4-1973.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-48523, filed 7/20/94, effective 9/20/94. Statutory Authority: RCW

49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-48523, filed 1/21/86.]

WAC 296-155-48525 Manually propelled elevating work platforms. (1) All applicable rules for design, construction, maintenance, operation, testing and use of manually propelled elevating work platforms shall be in accordance with ANSI A92.3-1980.

(2) General requirements.

(a) Any manually propelled elevating work platform, when raised to its maximum working height, on level ground, shall be capable of sustaining, without reaching instability, a minimum horizontal test force of fifty pounds or fifteen percent of the rated capacity, whichever is greater, applied to any point on the perimeter of the platform while the platform is carrying the rated work load.

(b) Any manually propelled elevating work platform, unless designed for such use by the manufacturer, shall not be used on an inclined surface.

(c) Any work platform designed by the manufacturer to be operated on an inclined surface shall also be capable of passing the stability tests outlined in (a) of this subsection while on such a surface. Procedures for maintaining stability shall be clearly outlined in the special warnings section of the operating instructions and users shall follow these instructions.

(d) If outriggers or stabilizers must be employed to meet the tests for stability outlined in (a) of this subsection, the operating instructions shall require their use and such outriggers or stabilizers shall be provided and used.

(e) The platform width shall not be less than eighteen inches and shall be provided with a surface to minimize slipping.

(f) The platform shall be provided with a guardrail or other structure around its upper periphery and the guardrail shall be approximately forty-two inches high, plus or minus three inches, with a midrail approximately midway between the top rail and the platform surface.

(i) The guardrail system shall be designed and constructed to withstand a load of twenty-five pounds per linear foot applied in a horizontal direction to the top rail or midrail.

(ii) The top rail or midrail shall withstand a concentrated load of three hundred pounds applied vertically to the top of either rail midway between the supporting posts.

(iii) Guardrail terminal posts shall withstand two hundred pounds applied in any direction at the top of the post.

(g) The platform shall be provided with four-inch (nominal dimension) toeboards on all sides.

(h) Toeboards may be omitted at the access openings.

(i) The configuration of the work platform shall include access for personnel to use in reaching the platform deck when it is in the lowered position.

(i) Any access system used in this way shall have rungs or steps located on uniform centers not to exceed sixteen inches.

(ii) Steps or rungs shall be provided with a face that minimizes slipping.

(3) Safety factor specifications.

(a) Where the platform is supporting its rated work load by a system of wire ropes or chains, or both, the safety

factor of the wire rope or chain shall not be less than eight to one, based on ultimate strength.

(b) All critical components of a hydraulic or pneumatic system used in a work platform shall have a bursting strength that exceeds the pressure attained when the system is subjected to the equivalent of four times the rated work load. (Critical components are those in which failure would result in a free descent.)

(c) All noncritical hydraulic components shall have a bursting strength safety factor of at least two to one.

(4) Fail safe requirements.

(a) Where the elevation of the platform is accomplished by an electromechanical assembly, the system shall be designed to prevent free descent in the event of a generator or power failure.

(b) Where the elevation of the platform is accomplished by a hydraulic or pneumatic cylinder assembly, the system shall be so equipped as to prevent free descent in the event of failure of a hydraulic or pneumatic line.

(c) Where the platform is horizontally extendable beyond the base of the machine, the system shall be so equipped as to prevent descent in the event of failure of a hydraulic or pneumatic line, wire rope, or chain.

(d) Where the elevation of the platform is accomplished by a single hoist cable, the system shall be protected by a broken-cable safety device which will prevent free descent of the platform.

(e) Where the elevation of the platform is accomplished by a manual-mechanical or manual-hydraulic assembly, the considerations established above shall apply.

(f) The control system shall be designed so that a single malfunction in the control system will not result in unintended machine motion.

(g) Hydraulically or pneumatically actuated outriggers or stabilizers, or both, shall be so constructed as to prevent their retraction in the event of failure of a hydraulic or pneumatic line.

(5) Emergency lowering means. Any work platform equipped with a powered elevating assembly shall be supplied with clearly marked emergency lowering means readily accessible from ground or floor level.

(6) Guarding. Mechanical power transmission apparatus shall be guarded in accordance with WAC 296-24-205, General safety and health standards.

(7) Directional controls.

(a) All directional controls shall be marked for the direction they control and shall be of the type which automatically returns to the "off" or the neutral position when released.

(b) Controls shall be protected against inadvertent operation.

(8) Motor requirements.

(a) Fuel lines of internal-combustion-engine-powered work platforms shall be supported to minimize chafing and positioned to minimize exposure to engine exhaust heat. Liquid fuel lines shall be hard lines except where isolation from vibration requires a flexible connection.

(b) LP-gas engine fuel systems shall comply with the American National Standard for Storage and Handling of Liquefied Petroleum Gases, ANSI/NFPA 58-1983.

(c) The exhaust system shall be provided with a muffler that is positioned to minimize exposure to noise and exhaust

gas of the operators and personnel located in proximity to the unit.

(9) Prevention of lateral movement. Each work platform shall be provided with locking screws, floor locks, wheel-locking mechanisms, or other means of preventing unintended lateral motions while in use.

(10) Specifications display. The following information shall be displayed on all work platforms in as permanent and as visible a manner as practical:

(a) Warnings, cautions, or restrictions for safe operation in accordance with American National Standard Specifications for Accident Prevention Signs, ANSI Z35.1-1972 and ANSI Z35.4-1973.

(b) Make, model, serial number, and manufacturer's name and address.

(c) Rated work load.

(d) Maximum platform height.

(e) Nominal voltage rating of batteries or rated voltage of AC line.

(f) Statement of the need for the operator's familiarity with the work platform before it is used.

(11) Alternative configuration statement. When a work platform is designed with alternative configurations:

(a) The manufacturer shall clearly describe these alternatives, including the rated capacity in each situation.

(b) If the rated work load of a platform is the same in any designed configuration, these additional descriptions are not necessary.

(12) Insulation marking. A statement of whether or not the work platform is electrically insulated. If insulated, the level of protection and the applicable test standard shall be stated in accordance with ANSI A92.2-1979.

(13) Maintenance and operating manuals requirement. An operating and maintenance manual(s) shall be provided with each work platform and shall contain:

(a) Descriptions, specifications, and ratings of the work platform, including the data specified in subsection (10) of this section.

(b) The maximum hydraulic and pneumatic systems pressure and the maximum voltage of the electrical systems which are part of the work platform.

(c) Instructions regarding operation and maintenance.

(d) Replacement part(s) information.

(14) Rated load display. The rated work load shall be clearly displayed at each entrance to the work platform.

(15) Management responsibilities.

(a) Employers responsibilities shall be in accordance with ANSI A92.3-1980.

(b) Only trained and authorized personnel shall be permitted to operate the work platform.

(c) Work platforms that are not in safe operating condition shall be removed from service until repaired.

(d) Repairs shall be made by a qualified person in conformance with the manufacturer's operating and maintenance manuals.

(e) Operators shall be trained in care and use before operation, care and use during operation, horizontal relocation, and additional requirements as specified in ANSI A92.3-1980.

(f) Modifications or alterations of work platforms shall be made only with written permission of the manufacturer or any other equivalent entity.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-48525, filed 1/21/86.]

WAC 296-155-48527 Self propelled elevating work platforms. (1) All applicable rules for design, construction, maintenance, operation, testing and use of self propelled elevating work platforms shall be in accordance with ANSI A92.6-1979.

(2) Minimum rated work load.

(a) The minimum rated work load of work platforms shall not be less than two hundred fifty pounds.

(b) All structural load-supporting elements of the work platform shall have a structural safety factor of not less than two based on the minimum yield strength of the material.

(c) All structural load-supporting elements of the work platform that are made of nonductile material (such as cast iron and fiberglass) shall have a structural safety factor of not less than five based on the minimum ultimate strength of the material.

(d) Design and stability tests shall be in accordance with ANSI A92.6-1979.

(e) Each production unit on level ground shall sustain a load test with a platform load at least one hundred fifty percent of the rated capacity imposed. The test shall include the movement of the platform through its entire range of motion.

(3) Driving interlock.

(a) The unit shall use interlock means that will prevent driving the unit unless the platform height, platform configuration, or any combination of these, are adjusted to meet the stability test requirements.

(b) A work platform limited in driveable height by the interlock means may be elevated and used while stationary up to the maximum platform heights at which it will maintain stability during the following static test. At the maximum platform height, on level ground, with the platform carrying the rated work load, apply a horizontal test force of one hundred fifty pounds or fifteen percent of the rated platform load (whichever is greater) at the point on the perimeter of the platform most likely to cause overturning.

(4) Platform outrigger interlocks. Where outriggers, stabilizers, or extendable axles are required to meet the side load test, interlocks shall prevent the platform from being raised above the height at which these devices are required unless the required devices are extended. Interlocks shall also prevent the retraction of these devices while the platform is above that level.

(5) Platform requirement.

(a) A guardrail or other structure shall be provided around its upper periphery, which shall be approximately forty-two inches plus or minus three inches in height, a midrail, and toeboards which shall be not less than four inches high (nominal dimension). Guardrail and midrail chains, or the equivalent, may be substituted across an access opening. Toeboards may be omitted at the access opening.

(b) The work platform shall have a minimum width of eighteen inches. Proper access shall be provided for personnel to use in reaching the platform deck when it is in the lowered position.

(c) A floor surface shall be provided for both the platform and the access that will minimize slipping.

(6) System safety factors.

(a) When the platform supports its rated work load by a system of wire ropes or chains, or both, the safety factor of the wire rope or chains shall not be less than eight to one, based on ultimate strength.

(b) All critical hydraulic components, all pneumatic components, and all hoses of hydraulic or pneumatic systems shall have a minimum bursting strength of at least four times the operating pressure for which the system is designed.

(c) Noncritical hydraulic components shall have a minimum bursting strength of at least twice the operating pressure for which the system is designed.

(7) Safety design requirements.

(a) Where the elevation of the platform is accomplished by an electromechanical assembly, the system shall be designed to prevent free descent in the event of a generator or power failure.

(b) Where the elevation of the platform is accomplished by a hydraulic or pneumatic cylinder assembly, the system shall be so equipped as to prevent free descent in the event of a hydraulic or pneumatic line failure.

(c) Where the platform is horizontally extendable beyond the base of the machine, the system shall be so equipped as to prevent descent in the event of a hydraulic or pneumatic line failure.

(d) Where the elevation of the platform is accomplished by a single hoist cable, the system shall be protected by a broken-cable safety device that will prevent free descent of the platform.

(e) In addition to the primary operator controls, the work platform shall be equipped with an emergency stop device located at the primary control station that will deactivate all powered functions.

(f) Hydraulically or pneumatically actuated outriggers or stabilizers, or both, shall be designed to prevent their retraction in the event of a hydraulic or pneumatic line failure.

(g) Any work platform equipped with a powered elevating assembly shall be supplied with clearly marked emergency lowering means readily accessible from ground level.

(h) Mechanical power transmission apparatus shall be guarded in accordance with WAC 296-24-205, General safety and health standards.

(8) Directional controls.

(a) Directional controls shall move in the direction of the function they control. The controls shall be of the type that automatically return to the off or the neutral position when released.

(b) Such controls shall be protected against inadvertent operation and shall be clearly marked.

(9) Engine requirement.

(a) Fuel lines of internal-combustion-engine-powered work platforms shall be supported to keep chafing to a minimum. They shall be located to keep exposure to engine and exhaust heat to a minimum.

(b) Liquid fuel lines shall be hard except where flexible connections are required for isolation from vibration.

(c) LP gas fuel systems shall use flexible LP gas hose or hard lines.

(d) Exhaust lines shall be equipped with mufflers. The lines shall be located to minimize the exposure of noise and fumes to operators and personnel near the units.

(10) Each work platform shall be equipped with a mechanical parking brake, which will hold the unit on any slope it is capable of climbing. Wheel chocks shall be installed before using an aerial lift on an incline, provided they can be safely installed.

(11) Specifications display. The following information shall be displayed on all work platforms in a clearly visible, accessible area and in as permanent a manner as possible:

(a) Warnings, cautions, or restrictions for safe operation in accordance with ANSI Z35.1-1972 and ANSI Z35.4-1973.

(b) Make, model, serial number, and manufacturer's name and address.

(c) Rated work load.

(d) Maximum platform height.

(e) Nominal voltage of the batteries if battery powered.

(f) A notice to study the operating/maintenance manual before using the equipment.

(g) Alternative configuration statement. If a work platform is susceptible to several alternative configurations, then the manufacturer shall clearly describe these alternatives, including the rated capacity in each situation. If the rated work load of a work platform is the same in any configuration, these additional descriptions are not necessary.

(h) A clear statement of whether or not the platform and its enclosure are electrically insulated. If insulated, the level of protection and the applicable test standard shall be stated, in accordance with ANSI 92.2-1979.

(i) The rated work load shall be clearly displayed at each entrance to the platform.

(12) Lift manual requirement. Each work platform shall be provided with an appropriate manual. The manual shall contain:

(a) Descriptions, specifications, and ratings of the work platform, including the data specified in subsection (11)(h) and (i) of this section.

(b) The maximum system pressure and the maximum voltage of the electrical systems that are part of the work platform.

(c) Instructions regarding operation, maintenance, and weld specifications.

(d) Replacement parts information.

(13) Inspection and maintenance.

(a) Each work platform shall be inspected, maintained, repaired and kept in proper working order in accordance with the manufacturer's maintenance and repair manuals.

(b) Any work platform not in safe operating condition shall be removed from service until it is repaired.

(c) All repairs shall be made by a qualified service person in conformance with the manufacturer's maintenance and repair manuals.

(14) Operator requirements. Only trained and authorized personnel shall be permitted to operate the work platform. Before using the work platform, the operator shall:

(a) Read and understand the manufacturer's operating instructions and safety rules, and be trained by a qualified person on the contents of the manufacturer's instructions and safety rules.

(b) Read and understand all decals, warnings, and instructions on the work platform.

(c) On a daily basis, before the work platform is used, it shall be given a thorough inspection, which shall include:

(i) Inspection for defects such as cracked welds, hydraulic leaks, damaged control cable, loose wire connections, and tire damage.

(ii) Inspection of functional controls for proper operation.

(d) Any suspect items discovered through inspection shall be carefully examined and a determination made by a qualified service person as to whether they constitute a safety hazard. All unsafe items shall be corrected before further use of the work platform.

(e) Before the work platform is used, the operator shall survey the area for hazards such as:

(i) Untamped earth fills.

(ii) Ditches.

(iii) Dropoffs or holes.

(iv) Bumps and floor obstructions.

(v) Debris.

(vi) Overhead obstructions and high-voltage conductors.

(vii) Other possible hazardous conditions.

(15) Requirement for operations. The work platform shall be used only in accordance with the Manufacturer's Operating Instructions and Safety Rules, ANSI A92.6-1979, and this standard.

(a) Only trained and authorized personnel shall be permitted to operate the work platform.

(b) Before each elevation of the work platform, the operator shall:

(i) Check for overhead obstructions and high-voltage conductors. A minimum distance of ten feet from energized high-voltage conductors shall be maintained at all times between the conductors and the operator and platform equipment.

(ii) Ensure that the work platform is elevated only on a firm and level surface.

(iii) Ensure that the load and its distribution on the platform are in accordance with the manufacturer's rated capacity. The manufacturer's recommended load limits shall never be exceeded.

(iv) Ensure that outriggers and stabilizers are used if the manufacturer's instructions require their use.

(v) Ensure that guardrails are properly installed, and gates or openings are closed.

(c) Before and during driving while the platform is elevated, the operator shall:

(i) Be required to look in the direction of, and keep a clear view of, the path of travel and assure that the path of travel is firm and level.

(ii) Maintain a safe distance from obstacles, debris, dropoffs, holes, depressions, ramps, or other hazards to safe elevated travel.

(iii) Maintain a safe distance from overhead obstacles.

(d) The operator shall limit travel speed according to conditions. Conditions to be observed are: Ground surface, congestion, slope, location of personnel, and other factors that may create a hazard of collision or injury to personnel.

(e) Stunt driving and horseplay shall not be permitted.

(f) Personnel shall maintain a firm footing on the platform while working thereon unless they are secured by safety harness and lanyard devices fixed to manufacturer-approved hard points. Use of railings or planks, ladders or any other device on the work platform for achieving additional height shall be prohibited.

(g) The operator shall immediately report defects or malfunctions which become evident during operation and shall stop use of the work platform until correction has been made.

(h) Altering or disabling of safety devices or interlocks shall be prohibited.

(i) Care shall be taken to prevent ropes, electric cords, hoses, etc., from tangling with the work platform when the platform is being elevated, lowered, or moved.

(j) Work platform rated capacities shall not be exceeded when loads are transferred to the platform at elevated heights.

(k) The operator shall ensure that the area surrounding the work platform is clear of personnel and equipment before lowering the platform.

(16) Fuel tanks shall not be filled while the engine is running. Spillage shall be avoided.

(17) Batteries shall not be charged except in an open, well-ventilated area, free of flame, smoking, spark, or fire.

(18) Modifications. All modifications and alterations to work platforms shall be certified in writing as being in conformance with ANSI A92.6-1979 by the manufacturer or any equivalent entity, such as a nationally recognized testing laboratory.

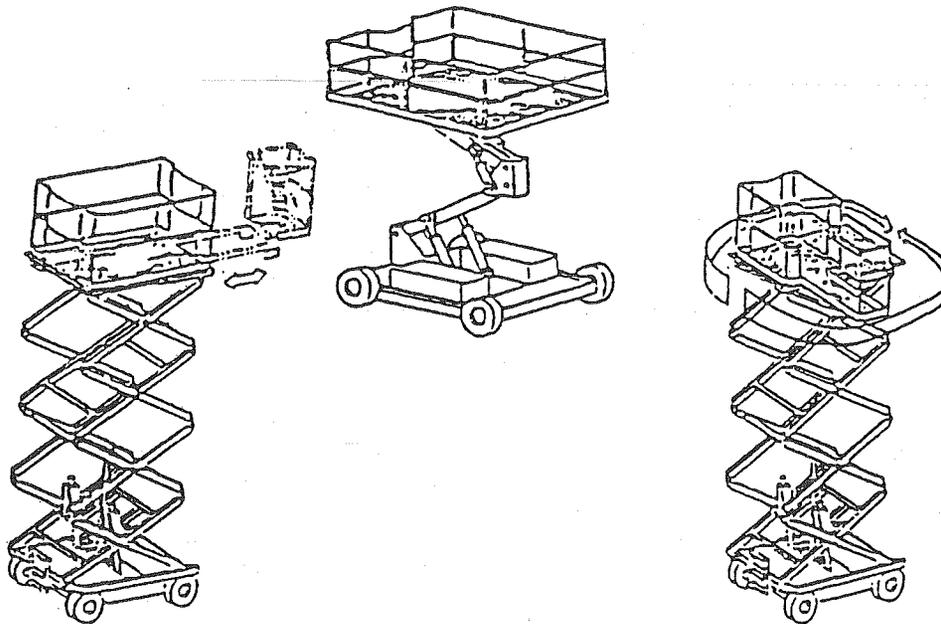


Fig. 1
Examples of Work Platform Configurations

[Statutory Authority: Chapter 49.17 RCW. 92-17-022 (Order 92-06), § 296-155-48527, filed 8/10/92, effective 9/10/92. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-48527, filed 1/21/86.]

WAC 296-155-48529 Boom supported elevating work platforms. (1) All applicable rules for design, construction, maintenance, operation, testing and use of boom supported elevating work platforms shall be in accordance with ANSI A92.5-1980.

(2) Minimum rated work load. The minimum rated work load of a work platform shall be three hundred pounds. Either single or multiple ratings may be used.

(a) Work platforms with single ratings shall include means which clearly present the rated work load to the operator at the platform control station.

(b) Work platforms having multiple configurations with multiple ratings shall have means which clearly describe the rated work load of each configuration to the operator at the platform control station. Examples of multiple configurations are:

(i) Outriggers extended to firm footing versus outriggers not extended.

(ii) Large platform versus small platform.

(iii) Extendable boom retracted versus extended.

(iv) Boom elevated versus lowered.

(v) Extendable axles extended versus retracted.

(3) Boom angle indicator: When the rated capacity of the alternate configuration depends on the angle the boom makes with the horizontal, the manufacturer shall install means by which that angle can be determined. Such means shall be clearly displayed to the operator at the platform control station.

(4) Structural safety.

(a) All load-supporting structural elements of the work platform shall have a structural safety factor of not less than

two to one based on the minimum yield strength of the materials used.

(b) The load-supporting structural elements of the work platform that are made of nonductile material which will not deform plastically before breaking shall have a structural safety factor of not less than five to one based on the minimum ultimate strength of the materials used.

(c) The design stress used in determining the structural safety factor shall be the maximum stresses developed within the element with the machine operating at its rated work load, used in the type of service for which it was designed, and operated in accordance with manufacturer's operation instructions.

(d) The design stress shall include the effects of stress concentration and dynamic loading as shown in ANSI A92.5-1980.

(5) Platform stability.

(a) Each work platform shall be capable of maintaining stability while sustaining a static load equal to one and one-third times its rated work load, concentrated anywhere twelve inches inside the perimeter of the platform, throughout its entire range of motion while on a slope of five degrees from the horizontal in the direction most likely to cause overturning.

(i) If having the outriggers, stabilizers, or extendable axles in contact with the supporting surface is part of the normal configuration to meet the stability requirements, they shall be extended.

(ii) A visual inspection shall be made to determine whether this test has produced an adverse effect on any component.

(b) Each work platform shall sustain on level ground a test load equal to one and one-half times its rated work load throughout the entire range of motion in which the boom can be placed.

(i) The test load shall be placed with its center of gravity twelve inches inboard from the guardrail while the unit is in the least stable position.

(ii) The work platform shall remain stable during this test.

(iii) A visual inspection shall be made to determine whether this test has produced an adverse effect on any component.

(c) Each work platform shall be capable of maintaining stability when positioned on a five degree slope in its backward stability configuration in the direction and condition most likely to cause overturning, while sustaining a horizontal force of one hundred fifty pounds or fifteen percent of rated capacity, whichever is greater, applied to the upper perimeter of the platform in the direction most likely to cause overturning (see Fig. 1). Note that the most adverse condition may be with zero or with rated work load (concentrated one foot inside perimeter of platform), depending on basket configuration.

(i) If having the outriggers, stabilizers, or extendable axles in contact with the supporting surface is part of the normal configuration to meet stability requirements, they shall be extended.

(ii) A visual inspection shall be made to determine whether this test has produced an adverse effect on any component.

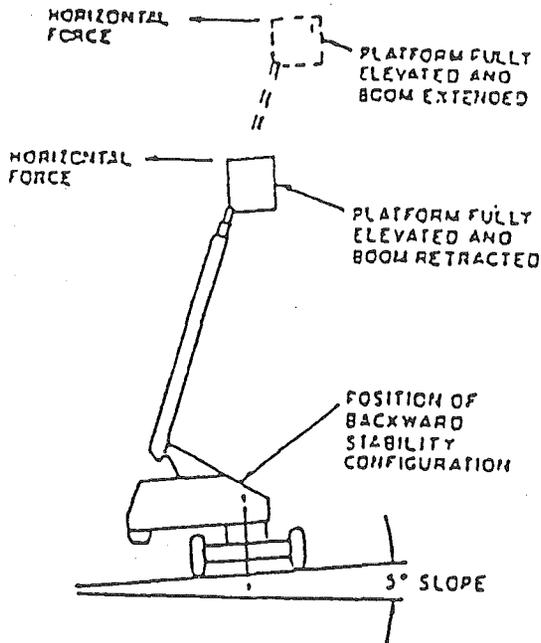


Fig. 1

(6) Work platform design requirement. The work platform shall be provided with a guardrail or other structure approximately forty-two inches plus or minus three inches high around its upper periphery, with a midrail, and with toeboards not less than four inches high. Guardrails and midrail chains or the equivalent may be substituted across an access opening.

(a) All stepping, standing, and working surfaces shall be skid resistant.

(b) Attachment points shall be provided for a body belt and lanyard for each person occupying the platform.

(7) Work platform controls. Work platforms shall have both primary and secondary controls.

(a) Primary controls shall be readily accessible to the operator on the platform.

(b) Secondary controls shall be designed to override the primary controls and shall be readily accessible from ground level.

(c) Both primary and secondary controls shall be clearly marked, using permanent legible identification which can be easily understood.

(d) All directional controls shall move in the direction of the function which they control when possible, and shall be of the type which automatically returns to the "off" or the neutral position when released.

(e) Such controls shall be protected against inadvertent operation.

(8) Outrigger interlocks. Where the work platform is equipped with outriggers, stabilizers, or extendable axles, interlocks shall be provided to ensure that the platform cannot be positioned beyond the maximum travel height unless the outriggers, stabilizers, or extendable axles are properly set. Control circuits shall ensure that the driving motor(s) cannot be activated unless the outriggers or stabilizers are disengaged and the platform has been lowered to the maximum travel height (MTH).

(9) Auxiliary operating means: All work platforms shall be provided with an auxiliary means of lowering, retracting, and rotating in the event of primary power loss.

(10) Emergency stop: All work platforms shall be equipped with an emergency stop device, readily accessible to the operator, which will effectively de-energize all powered systems in case of a malfunction.

(11) Tilt alarm: All work platforms shall be fitted with an alarm or other suitable warning at the platform, which will be activated automatically when the machine base is more than five degrees out of level in any direction.

(12) System safety factors.

(a) Where the platform is supporting its rated work load by a system of wire ropes or lift chains, or both, the safety factor of the wire rope or chain shall not be less than eight to one, based on ultimate strength.

(b) All critical components and hoses of hydraulic and pneumatic systems shall have a minimum bursting strength of four times the operating pressure for which the system is designed.

(c) Noncritical components shall have a minimum bursting strength of two times the operating pressure for which the system is designed.

(d) Critical components are defined as those in which a malfunction would result in a free descent of the platform.

(13) Failsafe requirements.

(a) Where the elevation of the platform is accomplished by an electromechanical assembly, the system shall be so designed as to prevent free descent in the event of a generator or power failure.

(b) Where the elevation of the platform is accomplished by a hydraulic or pneumatic cylinder assembly, the system shall be so equipped as to prevent free descent in the event a hydraulic or pneumatic line bursts.

(c) Hydraulically or pneumatically actuated outriggers or stabilizers, or both, shall be so designed as to prevent their retraction in the event a hydraulic or pneumatic line bursts.

(14) Engine requirement.

(a) Fuel lines of internal-combustion-engine-powered work platforms shall be supported to keep chafing to a minimum and located to keep exposure to engine and exhaust heat to a minimum.

(b) Liquid fuel lines shall be hard except where flexible connections are required for isolation from vibration.

(c) LP gas fuel systems shall use flexible LP gas hose or hard lines.

(d) Exhaust lines shall be equipped with mufflers and shall be located to minimize the exposure to noise and fumes of operators and personnel located in the proximity of such units.

(15) Specifications display. There shall be displayed on all work platforms, in a permanent manner, at a readily visible location, the following information:

(a) Special warnings, cautions, or restrictions necessary for safe operation in accordance with ANSI Z35.1-1972 and Z35.4-1973.

(b) Make, model, serial number, and manufacturer's name and address.

(c) Rated work load.

(d) Maximum platform height and maximum travel height.

(e) Reference to studying operating instructions in manual before use.

(f) Alternative configuration statement. If a work platform is capable of several alternative configurations and loads, the alternatives shall be clearly described.

(g) A clear statement of whether or not the platform and its enclosure are electrically insulated. If they are electrically insulated, the voltage at which the platform is rated and the applicable test standard shall be stated.

(h) The rated work load shall be clearly displayed at each entrance to the platform and the operator control station.

(16) Lift manual requirements. Each work platform shall be provided with a manufacturer's manual(s) containing the following information:

(a) Descriptions, specifications, and ratings of the work platform, including the data specified in subsection (17) of this section.

(b) The maximum hydraulic operating pressure and the maximum voltage of the electrical systems which are part of the platform.

(c) Instructions regarding operation, safety rules, maintenance, and repair.

(d) Replacement parts information.

(17) Inspection and maintenance.

(a) Each work platform shall be inspected, maintained, repaired, and kept in proper working condition in accordance with the manufacturer's maintenance and repair manuals.

(b) Any work platform found not to be in safe operating condition shall be removed from service until repaired.

(c) All repairs shall be made by a qualified person in conformance with the manufacturer's maintenance and repair manual(s).

(18) Operator requirements. Only trained and authorized persons shall be permitted to operate the work platform. Before using the work platform, the operator shall:

(a) Be instructed by a qualified person in the intended purpose and function of each of the controls.

(b) Read and understand the manufacturer's operating instructions and safety rules, or be trained by a qualified person on the contents of the manufacturer's operating instructions and safety rules.

(c) Understand by reading or by having a qualified person explain all decals, warnings, and instructions displayed on the work platform.

(d) Prior to use on each work shift, the work platform shall be inspected for defects that would affect its safe operation and use. The inspection shall consist of the following:

(i) Visual inspection for cracked welds or other structural defects, hydraulic leaks, damaged control cables, loose wire connections, and tire damage.

(ii) Function test of the operating controls to ensure that they perform their intended functions. Any suspect items shall be carefully examined and a determination made by a qualified person as to whether they constitute a safety hazard. All unsafe items shall be corrected before further use of the work platform.

(iii) Before the work platform is used and during use, the job site shall be checked for hazards such as ditches, dropoffs or holes, bumps and floor obstructions, debris, overhead obstructions and high-voltage conductors, and other possible hazardous conditions.

(19) Requirements for operation. The work platform shall be used only in accordance with the manufacturer's operating instructions and safety rules, ANSI 92.6-1979 and this standard.

(a) Only trained and authorized personnel shall be permitted to operate the work platform.

(b) Before each elevation of the work platform, the operator shall:

(i) Check for overhead obstructions and high-voltage conductors. A minimum distance of ten feet from energized high-voltage conductors shall be maintained at all times between the conductors and the operator and platform equipment.

(ii) Ensure the work platform is elevated only on a firm and level surface.

(iii) Ensure that the load and its distribution on the platform are in accordance with the manufacturer's rated capacity. The manufacturer's rated work load shall never be exceeded.

(iv) Ensure that outriggers or stabilizers are used in accordance with manufacturer's instructions. Wheel chocks shall be installed before using an aerial lift on an incline, provided they can be safely installed.

(v) Ensure that platform guardrails are properly installed and gates or openings are closed.

(vi) Check to see that all occupants' full body harnesses are on and properly attached.

(c) Before and during driving while elevated, the operator shall:

(i) Be required to look in the direction of, and keep a clear view of, the path of travel and make sure that the path is firm and level.

(ii) Maintain a safe distance from obstacles, debris, dropoffs, holes, depressions, ramps, and other hazards to safe elevated travel.

(iii) Maintain a safe distance from overhead obstacles.

(d) Under all travel conditions the operator shall limit speed according to conditions of ground surface, congestion, slope, location of personnel, and other factors which may create a hazard of collision or injury to personnel.

(e) Stunt driving and horseplay shall not be permitted.

(f) Personnel shall maintain a firm footing on the platform while working thereon. Safety harness and lanyard devices fixed to attachment points provided and approved by the manufacturer shall be used by all occupants. Use of railings, planks, ladders, or any other device on the work platform for achieving additional height shall be prohibited.

(g) The operators shall immediately report to their supervisor any defects or malfunctions which become evident during operation. Any defects or malfunctions that affect the safety of operation shall be repaired prior to continued use of the work platform.

(h) Altering, modifying, or disabling safety devices or interlocks is prohibited.

(i) Care shall be taken to prevent ropes, electric cords, hoses, and the like from becoming entangled in the work platform when it is being elevated, lowered, or moved.

(j) Work platform rated capacities shall not be exceeded when live loads are transferred to the platform at elevated heights.

(k) The operator shall ensure that the area surrounding the work platform is clear of personnel and equipment before lowering the platform.

(20) Refueling: Fuel tanks shall not be filled while the engine is running. Caution shall be used while filling tanks to avoid spilling fuel.

(21) Battery charging: Batteries shall not be charged except in an open, well ventilated area free of flame, smoking, spark, and fire.

(22) Modifications: There shall be no modification or alteration to work platforms without the modifications being approved and certified in writing by the manufacturer or other equivalent entity, such as a nationally recognized testing laboratory, to be in conformance with all applicable provisions of ANSI A92.5-1980 and this standard.

[Statutory Authority: Chapter 49.17 RCW. 92-17-022 (Order 92-06), § 296-155-48529, filed 8/10/92, effective 9/10/92; 91-03-044 (Order 90-18), § 296-155-48529, filed 1/10/91, effective 2/12/91; 89-11-035 (Order 89-03), § 296-155-48529, filed 5/15/89, effective 6/30/89. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-48529, filed 1/21/86.]

WAC 296-155-48531 Vehicle mounted elevating and rotating aerial devices. (1) All applicable rules for design, construction, maintenance, operation, testing, and use of vehicle mounted elevating and rotating aerial devices shall be in conformance with American National Standards for "Vehicle Mounted Elevating and Rotating Work Platforms," ANSI A92.2-1969 and as amended through ANSI A92.2-1979.

(2) Application:

(a) Aerial lifts acquired before February 21, 1986, which do not meet the requirements of ANSI A92.2-1979, may not be used unless they have been modified so as to conform

with the applicable design and construction requirements of ANSI A92.2-1969.

(b) Aerial devices include the following:

(i) Extensible boom platforms;

(ii) Aerial ladders;

(iii) Articulating boom platforms;

(iv) Vertical towers; and

(v) A combination of any of the above.

(3) Specification display. The aerial device shall have manufacturer's statement clearly stating the minimum values for the following characteristics of vehicles required to provide a stable and structurally sound carrier for the aerial device:

(a) The front gross axle weight rating (GAWR front).

(b) The rear gross axle weight rating (GAWR rear).

(c) The gross vehicle weight rating (GVWR).

(d) The frame section modulus.

(e) The yield strength of the vehicle frame.

(f) The frame resisting bending moment (RBM).

(g) The wheelbase dimension (WB).

(h) The rear of cab to rear axle centerline dimension (CA).

(4) Data display: The following information shall be clearly stated in the manufacturer's manual and on the aerial device.

(a) Make and model.

(b) Rated load capacity.

(c) Aerial device height and reach.

(d) Maximum pressure of the hydraulic system and voltage of the electrical system.

(e) Cautions and restrictions of operations.

(5) Types of rated load: Rated load capacity is of two distinct types:

(a) The platform load consisting of the weight of personnel and all items carried on or in the platform.

(b) Supplemental loads which may be fixed directly to the boom(s), or to load-carrying attachments on the aerial device.

(i) The capacity rating in either case shall be designated with boom or booms extended to the position of maximum overturning moment attainable throughout full rotation of the pedestal.

(ii) Capacities of the aerial device in other positions shall be specified separately.

(iii) The manual and placards affixed to the aerial device shall state all applicable capacity ratings.

(6) Multiple configuration rated load. If the aerial device is specified in multiple configurations, these configurations shall be clearly described including the rated load capacity of each, in the manufacturer's manual and on the aerial device. Examples of alternate configurations are:

(a) With outriggers extended to firm footing versus outriggers not extended.

(b) With chassis suspension locking device engaged versus disengaged.

(c) With one platform versus more than one platform.

(d) Used as a personnel-carrying device only versus used as a personnel-carrying and material-handling device.

(e) With extensible aerial device retracted or extended.

(f) With digger attached to boom versus with digger removed from boom. If the rated load capacity of the alternate configuration is related to an angle which a

boom(s) makes with the horizontal, the manufacturer shall install a means by which the angle of the boom(s) can be determined.

(7) Maximum elevation determination: Height shall be determined at maximum elevation, from the floor of the platform to the ground, with the aerial device assumed to be mounted on a vehicle having a chassis frame height of thirty-six inches.

(8) Maximum reach determination: Reach, as a maximum, shall be measured in the horizontal plane, from the centerline of rotation to the outer edge (rail) of the platform.

(9) Insulated aerial devices.

(a) The aerial device manufacturer's manual and instruction plate(s) shall clearly state whether the aerial device is insulated or noninsulated.

(b) In the case of insulated aerial devices.

(i) The manual and instruction plate(s) shall clearly state the qualification voltage for which the aerial device has been satisfactorily tested in accordance with this standard.

(ii) The manual and instruction plate(s) shall clearly state the design voltage for which the aerial device can be tested.

(iii) All components bridging the insulated portions of the aerial device shall have electrical insulating values consistent with the design voltage rating of the upper boom, and, when provided, of the lower insulator.

(iv) Test electrodes on articulating-boom aerial devices rated over 69 kV, and optionally at 69 kV, shall be installed permanently on the inside and outside surfaces of the insulated portion of the upper boom for the purposes of monitoring electrical leakage current.

(v) The test electrodes shall be two to six inches from the metal portion of the lower end of the insulated upper boom.

(vi) All hydraulic and pneumatic lines bridging the insulated portion of the upper boom shall have metallic couplings which connect the inside and outside of any hose and shall be adjacent to the insulated boom test electrodes.

(vii) The test electrode on the outside surface of the insulated boom on extensible-boom aerial devices shall be removable.

(viii) The location of the removable test electrode shall be permanently marked or recorded to facilitate repeating future tests of the apparatus.

(10) Quality control. The design and manufacture of the aerial device shall comply with the principles outlined in this subsection. The manufacture of the aerial device shall include a quality control system which will ensure compliance with ANSI A92.2-1979 and this standard. The drawings and manual shall specify those welds that are considered critical and that must conform to the following standards:

(a) Structural Welding Code, AWS D1.1-1979.

(b) Specifications for Welding Industrial and Mill Cranes, AWS D14.1-1970.

(c) Standards for Qualifications of Welding Procedures and Welders for Piping and Tubing, AWS D10.9-1969.

(i) The manufacture and installation of aerial devices shall include applicable welding quality control procedures for all weldments.

(ii) Methods of nondestructive testing shall be described in the quality control procedures.

(iii) The quality control procedures shall designate the welds to be examined, the extent of examination, and the method of testing.

(iv) Appropriate inspection methods of welds are recommended by the American Welding Society.

(v) The structural load-supporting elements of the aerial device which support the platform, and which are made of a ductile material, shall have a design stress of not more than fifty percent of the minimum yield strength of the material, based on the combined rated load and weight of the support structure.

(vi) The structural load-supporting elements of the aerial device which support the platform, and which are made of a nonductile material, shall have a design stress of not more than twenty percent of the minimum ultimate strength of the material, based on the combined rated load and weight of the support structure.

(vii) The same structural safety factors stated above shall also apply to the platform.

(11) Aerial lift specification. Articulating-boom and extensible-boom aerial devices primarily designed as personnel carriers shall have both upper and lower controls.

(a) Upper controls shall be in or beside the platform, readily visible and available within easy reach of the operator, and protected from damage and inadvertent actuation.

(b) Lower controls shall be easily accessible and shall provide for overriding the upper controls. Lower level controls shall not be operated unless permission has been obtained from the employee in the lift, except in case of emergency.

(c) These and all other controls shall be plainly identified as to their function.

(d) The controls shall return to their neutral position when released by the operator.

(e) Vehicle-mounted articulating and telescoping cranes or derricks equipped with accessory platforms need not have controls at the platform station.

(f) Aerial ladders that are designed and manufactured with upper controls shall comply with the requirements of this subsection.

(g) Mechanical ladders that are counterbalanced for ease in raising to, and lowering from, an operating position shall be equipped with a locking device to secure the ladder in the lower traveling position.

(h) Each aerial device, when mounted on a vehicle meeting the manufacturer's minimum vehicle specifications, and used in a specific configuration, shall comprise a mobile unit capable of sustaining a static load one and one-half times its rated load capacity, in every position in which the load can be placed within the definition of the specific configuration, when the vehicle is on a firm and level surface. If having the outriggers extended to a firm footing is part of the definition of the configuration, they shall be extended to provide leveling for the purpose of determining whether the mobile unit meets the stability requirements.

(i) Each aerial device, when mounted on a vehicle meeting the manufacturer's minimum vehicle specifications, and used in a specific configuration, shall comprise a mobile unit capable of sustaining a static load one and one-third times its rated load capacity in every position in which the load can be placed within the definition of the specific

configuration when the vehicle is on a slope of five degrees downward in the direction most likely to cause overturning. If having the outriggers extended to a firm footing is part of the definition of the configuration, they shall be extended to provide leveling for the purpose of determining whether the mobile unit meets the stability requirements.

(j) If other facilities, such as a means of turntable leveling, are provided to minimize the effect of the sloping surface, then those facilities shall be utilized for the purpose of determining whether the mobile unit meets the stability requirements.

(k) Vertical towers designed specifically for operation only on a level surface shall be excluded from this requirement.

(l) None of the stability tests described in this subsection shall produce instability of the mobile unit as defined herein or cause permanent deformation of any component.

(m) The lifting of a tire or outrigger on the opposite side of the load does not necessarily indicate a condition of instability.

(12) Hydraulic components.

(a) All hydraulic components whose failure could result in free and unrestricted motion of the boom(s) shall have a minimum bursting strength of at least four times the operating pressure for which the system is designed.

(b) All hydraulic components normally rated according to bursting strength, such as hose, tubing, and fittings, shall have a minimum bursting strength of at least three times the operating pressure for which the system is designed.

(c) All hydraulic components normally rated according to performance criteria, such as rated flow and pressure, life cycles, pressure drop, rpm, torque, and speed, shall have a minimum bursting strength of at least two times the operating pressure for which the system is designed. Such components generally include pumps, motors, directional controls, and similar functional components.

(13) Power failure.

(a) Where the operation of the aerial device is accomplished by hydraulic means, the system shall be equipped with appropriate devices to prevent free and unrestricted motion of the aerial device in the event of hydraulic line failure.

(b) Where the operation of the aerial device is accomplished electrically, the system shall be designed to prevent free and unrestricted motion in the event of generator or power failure.

(c) This protection shall also apply to components used to stabilize a mobile unit where a system failure would result in instability.

(14) Platforms.

(a) Platform walls shall be approximately forty-two inches plus or minus three inches high when buckets or baskets are used as platforms, or the platforms shall be provided with a rail or other device around the periphery that also shall be approximately forty-two inches plus or minus three inches above the floor with a midrail and a kick plate that is at least four inches high, or its equivalent.

(b) A means shall be provided that allows personnel to attach a safety strap or lanyard to the platform or boom.

(c) Steps of all platforms shall be provided with nonskid surfaces.

(d) The platform wall height of any unit made in conformance with ANSI A92.2-1979 shall be acceptable.

(e) After the effective date of this standard, units shall conform to the requirements of this subsection.

(f) Platforms with folding-type floors and steps or rungs may be used without rails and kick plates if a method is provided to allow personnel equipped with a body belt and safety strap or lanyard to attach themselves to the platform or boom.

(g) Platforms for aerial ladders shall have a kick plate at least four inches high or its equivalent, around three sides of the platform.

(h) Provision shall be made to allow personnel equipped in accordance with chapter 296-155 WAC, Part C-1 with a full body harness and safety strap or lanyard to attach themselves to the ladder rail.

(15) Specifications display. The aerial device shall have identification, operation, and instruction placards, decals, plates, or the equivalent, which are legible, permanent, and readily visible. There shall be installed on each aerial device applicable markings or provide these markings with appropriate installation instructions. The markings on the aerial device shall not be removed, defaced, or altered. All missing or defective markings shall be replaced.

(a) An aerial device shall have the following markings:

(i) Identification markings.

(ii) Operation markings.

(iii) Instruction markings.

(b) Aerial devices shall have markings to indicate the following:

(i) Make.

(ii) Model.

(iii) Insulated or noninsulated.

(iv) Qualification voltage and date of test.

(v) Serial number.

(vi) Rated load capacity.

(vii) Height.

(viii) Aerial device system pressure or aerial device system voltage, or both.

(c) Aerial devices shall have markings describing the function of each control. Markings shall be determined by the manufacturer or the manufacturer and user jointly to indicate hazards inherent in the operation of an aerial device and those hazards for which the aerial device does not provide protection. The following instruction markings shall be provided for:

(i) Electrical hazards involved in the operation of the machine to warn that an aerial device does not provide protection to the operator from contact with or in proximity to an electrically charged conductor when they are in contact with or in proximity to another conductor.

(ii) Electrical hazards involved in the operation of the machine to warn that an aerial device, when working on or in proximity to energized conductors, shall be considered energized, and that contact with the aerial device or vehicle under those conditions may cause serious injuries.

(iii) Hazards that result from failure to operate the equipment in a prescribed manner.

(iv) Information related to the use and load rating of the equipment for material handling.

(v) Information related to the use and load rating of the aerial device for alternate configurations.

(vi) Information related to operator cautions.

(d) The color, format, and substance shall conform to:

(i) American National Standard for Accident Prevention Signs, ANSI Z35.1-1972.

(ii) American National Standard for Accident Prevention Tags, ANSI Z35.2-1968.

(iii) American National Standard for Informational Signs Complementary to ANSI Z35.1-1972 Accident Prevention Signs, ANSI Z35.4-1973.

(16) Testing of new aerial devices: In addition to the manufacturer's prototype tests and quality control measures, each new aerial device, including mechanisms, shall be tested to the extent necessary to ensure compliance with the operational requirements of this subsection.

(a) Operational tests shall include the following:

(i) Boom(s) elevating and lowering mechanism.

(ii) Boom extension mechanism.

(iii) Rotating mechanism.

(iv) Stability tests.

(v) Safety devices.

(b) A visual inspection of the finished unit shall be made to determine whether the operational test has produced an adverse effect on any component. Whoever mounts an aerial device upon a vehicle shall, before the mobile unit is placed in operation, perform stability tests in accordance with the requirements of subsection (11) of this section, and the operational and visual tests in accordance with this subsection.

(17) Electrical tests: All electrical tests shall be performed in accordance with ANSI A92.2-1979.

(18) Test reports: A certified report of the tests, specified in this subsection, signed by a registered professional engineer, or an equivalent entity shall be provided with each unit.

(19) Manual requirement: Aerial devices shall comply with the requirements of this standard and shall be provided with manuals. The manuals shall contain:

(a) Descriptions, specifications, and ratings of the aerial device.

(b) The maximum system pressure and the maximum voltage of electrical systems which are part of the aerial device.

(c) Instructions regarding operation, maintenance, and specified welds.

(d) Replacement part information.

(e) Instructions for installing or mounting the aerial device.

(20) Inspections:

(a) Prior to initial use, all new or modified mobile units shall be inspected and tested by the owners and users to ensure compliance with the provisions of this standard and ANSI A92.2-1979.

(b) The inspection procedure for mobile units in regular service is divided into two classifications based upon the intervals at which inspections and tests shall be performed. Safe intervals shall be set by the user, within the limits recommended by the manufacturer, and are dependent upon the nature of the critical components of the mobile unit and the degree of their exposure to wear, deterioration, or malfunction. The two classifications are designated as "frequent" and "periodic" with respective intervals between inspections and tests, as defined below:

(i) Frequent inspection and test: Daily to monthly intervals, or before use, if not used regularly.

(ii) Periodic inspection and test: One to twelve month intervals.

(21) Frequent inspections: Items such as, but not limited to the following shall be inspected for defects at the intervals as defined in subsection (20)(b)(i) of this section or as specifically indicated, including observation during operation, for any defects which might appear between regular inspections. These tests and inspections shall be performed by the operator. Any suspected items shall be carefully examined and a determination made by a qualified person as to whether they constitute a safety hazard. All unsafe items shall be corrected before further use.

(a) Operating controls and associated mechanisms for conditions interfering with proper operation.

(b) Operating controls and associated mechanisms for excessive component wear and contamination by foreign material.

(c) Visual and audible safety devices for malfunction.

(d) Hydraulic or pneumatic systems for observable deterioration or excessive leakage.

(e) Fiberglass and other insulating components for visible damage or contamination.

(f) Electrical apparatus for malfunction, signs of excessive dirt, and moisture accumulation.

(22) Periodic inspection. An inspection of the mobile unit shall be performed at the intervals defined in subsection (20)(b)(ii) of this section, depending upon its activity, severity of service, and environment, or as specifically indicated below. Any suspect items shall be carefully examined and a determination made by a qualified person as to whether they constitute a safety hazard. All unsafe items shall be corrected before further use. Nondestructive inspection and testing methods shall be used where there are questionable structural components.

(a) Deformed, cracked, or corroded members in the aerial device structure.

(b) Worn, cracked or distorted parts, such as pins, bearings, shafts, gears, rollers, locking devices, chains, chain sprockets, wire ropes, and sheaves.

(c) Hydraulic and pneumatic relief valve settings.

(d) Hydraulic system for proper oil level.

(e) Hydraulic and pneumatic fittings, hoses, and tubing for evidence of leakage, abnormal deformation, or excessive abrasion.

(f) Compressors, pumps, motors, and generators for loose fasteners, leaks, unusual noises or vibrations, loss of operating speed, and excessive heating.

(g) Hydraulic and pneumatic valves for cracks in the valve housing, leaks, and sticking spools.

(h) Hydraulic and pneumatic cylinders and holding valves for malfunction and visible damage.

(i) Hydraulic and pneumatic filters for cleanliness and the presence of foreign material in the system indicating other component deterioration.

(j) Performance test of all boom movements.

(k) Condition and tightness of bolts and other fasteners.

(l) Welds, as specified by the manufacturer.

(m) Legible and proper markings of controls, ratings, and instructions.

(23) Electrical insulation rating tests: If the aerial device is considered, rated, and used as an insulated device, the electrical insulating components and system, after a thorough inspection for lack of cleanliness and other hazards, shall be tested for compliance with the rating of the aerial device in accordance with one of the following applicable methods and procedures:

(a) In accordance with section 5.2 of ANSI A92.2-1979 where adequate test facilities are available.

(b) In the field if the aerial device is equipped with electrical test electrodes. The insulated boom may be raised into a high voltage line whose voltage is as high as or higher than the voltage to be worked but not exceeding the design voltage of the aerial device. The electrical leakage current shall not exceed 1 microampere per line to ground per kilovolt applied.

(c) For units rated 69 kV and under, by placing a fused and protected ammeter in the circuit between a test powerline and the conductive metal assembly at the bucket end of the insulated boom.

(i) The lower end of the boom section to be tested shall be grounded.

(ii) The ammeter shall be shielded from any stray electrical currents, and shall give the measurement of any leakage current across the boom and controls, or any capacitive currents involved from the platform to ground, or both.

(iii) The minimum voltage of the test line shall be that of any circuit on which the aerial device is to be used but not exceeding the design voltage of the aerial device.

(iv) During a three minute test period, the total current through the ammeter shall not exceed the following limits at the corresponding rated line voltages:

Line Voltage (kV)	Maximum Current (Microamperes)
69	1000
34.5	500
13.2	200

(d) For units rated 69 kV and under and not used for bare hand application, a dc test voltage and procedure shall be used. The dc potential and leakage current limit shall be specified by the aerial device manufacturer or an equivalent entity.

(e) For platform liners, a retest at seventy percent of the original factory test voltage in accordance with the procedures of section 5.2.2.5 of ANSI A92.2-1979, or the equivalent shall be made.

(f) All electrical tests shall be performed only by qualified persons who are aware of the dangers.

(24) Inspection documentation:

(a) A check sheet or list of items to be inspected shall be provided to the operator or other authorized person for use in making frequent inspections. Records of frequent inspections need not be made. However, where a safety hazard is found, it shall be reported in writing to a person responsible for the corrective action and that report and a record of the correction shall be maintained.

(b) Written, dated, and signed reports and records shall be made of periodic inspections and tests and retained for a period of time consistent with need. Records shall be

readily available. Manufacturer's recommendations as to the necessity and frequency of maintenance shall be followed.

(25) Modifications: No modifications or additions which affect the mechanical, hydraulic, or electrical integrity or the safe operation of the aerial device shall be made without the written approval of the manufacturer or an equivalent entity.

(a) If such modification or changes are made, the capacity, operation, and maintenance instruction markings shall be changed accordingly.

(b) In no case shall the safety factors be reduced below those specified in this standard, ANSI A92.2-1979, or below the manufacturer's design factors, whichever are greater.

(c) Changes in loading or additions made to the mobile unit after the final acceptance that affect weight distribution shall meet applicable loading regulations of the National Traffic and Motor Vehicle Safety Act of 1966 sections on Certification.

(26) Qualified operators: The user shall select and authorize only those persons qualified by training or experience, or both, to operate the aerial devices. Each operator shall be instructed in the safe and proper operation of the aerial device in accordance with the manufacturer's operator's manual and the user's work instructions.

(27) The truck shall not be moved until the boom or ladder is cradled and/or fastened down, the outrigger(s) retracted, and the power take-off disengaged, except for equipment which is specifically designed for this type of operation in accordance with provisions of subsections (1) and (2) of this section.

[Statutory Authority: Chapter 49.17 RCW. 95-10-016, § 296-155-48531, filed 4/25/95, effective 10/1/95; 94-15-096 (Order 94-07), § 296-155-48531, filed 7/20/94, effective 9/20/94; 92-17-022 (Order 92-06), § 296-155-48531, filed 8/10/92, effective 9/10/92; 91-03-044 (Order 90-18), § 296-155-48531, filed 1/10/91, effective 2/12/91; 90-17-051 (Order 90-10), § 296-155-48531, filed 8/13/90, effective 9/24/90. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-48531, filed 1/21/86.]

WAC 296-155-48533 Crane or derrick suspended personnel platforms. (1) Scope, application, and definitions.

(a) Scope and application. This standard applies to the design, construction, testing, use and maintenance of personnel platforms, and the hoisting of personnel platforms on the load lines of cranes or derricks.

(b) Definitions. For the purposes of this section, the following definitions apply:

(i) "Failure" means load refusal, breakage, or separation of components.

(ii) "Hoist" (or hoisting) means all crane or derrick functions such as lowering, lifting, swinging, booming in and out or up and down, or suspending a personnel platform.

(iii) "Load refusal" means the point where the ultimate strength is exceeded.

(iv) "Maximum intended load" means the total load of all employees, tools, materials, and other loads reasonably anticipated to be applied to a personnel platform or personnel platform component at any one time.

(v) "Runway" means a firm, level surface designed, prepared, and designated as a path of travel for the weight and configuration of the crane being used to lift and travel

with the crane suspended platform. An existing surface may be used as long as it meets these criteria.

(2) General requirements. The use of a crane or derrick to hoist employees on a personnel platform is prohibited, except when the erection, use, and dismantling of conventional means of reaching the worksite, such as a personnel hoist, ladder, stairway, aerial lift, elevating work platform or scaffold, would be more hazardous, or is not possible because of structural design or worksite conditions.

(3) Cranes and derricks.

(a) Operational criteria.

(b) Hoisting of the personnel platform shall be performed in a slow, controlled, cautious manner with no sudden movements of the crane or derrick, or the platform.

(c) Load lines shall be capable of supporting, without failure, at least seven times the maximum intended load, except that where rotation resistant rope is used, the lines shall be capable of supporting without failure, at least ten times the maximum intended load. The required design factor is achieved by taking the current safety factor of 3.5 (required under WAC 296-155-525 (3)(b)) and applying the fifty percent derating of the crane capacity which is required by (f) of this subsection.

(d) Load and boom hoist drum brakes, swing brakes, and locking devices such as pawls or dogs shall be engaged when the occupied personnel platform is in a stationary working position.

(e) The crane shall be uniformly level within one percent of level grade and located on firm footing. Cranes equipped with outriggers shall have them all fully deployed following manufacturer's specifications, insofar as applicable, when hoisting employees.

(f) The total weight of the loaded personnel platform and related rigging shall not exceed fifty percent of the rated capacity for the radius and configuration of the crane or derrick.

(g) The use of machines having live booms (booms in which lowering is controlled by a brake without aid from other devices which slow the lowering speeds) is prohibited.

(h) Multiple-part line block: When a multiple-part line block is in use, a substantial strap shall be used between the crane hook and common ring, shackle, or other equivalent device, to eliminate employee exposure to the lines running through the block, and to the block itself.

(4) Instruments and components.

(a) Cranes and derricks with variable angle booms shall be equipped with a boom angle indicator, readily visible to the operator.

(b) Cranes with telescoping booms shall be equipped with a device to indicate clearly to the operator, at all times, the boom's extended length, or an accurate determination of the load radius to be used during the lift shall be made prior to hoisting personnel.

(c) A positive acting device shall be used which prevents contact between the load block or overhaul ball and the boom tip (anti-two-blocking device), or a system shall be used which deactivates the hoisting action before damage occurs in the event of a two-blocking situation (two block damage prevention feature).

(d) The load line hoist drum shall have a system or device on the power train, other than the load hoist brake, which regulates the lowering rate of speed of the hoist

mechanism (controlled load lowering). Free fall is prohibited.

(5) Rigging.

(a) Lifting bridles on box-type platforms shall consist of four legs of equal length, with one end securely shackled to each corner of the platform and the other end securely attached to a common ring, shackle, or other equivalent device to accommodate the crane hook, or a strap to the crane hook.

(b) Shackle bolts used for rigging of personnel platforms shall be secured against displacement.

(c) A substantial safety line shall pass through the eye of each leg of the bridle adjacent to the common ring, shackle, or equivalent device.

(d) Securely fastened with a minimum amount of slack to the lift line above the headache ball or to the crane hook itself.

(e) All eyes in wire rope slings shall be fabricated with thimbles.

(f) Wire rope, shackles, rings, master links, and other rigging hardware must be capable of supporting, without failure, at least five times the maximum intended load applied or transmitted to that component. Where rotation resistant wire rope is used for slings, they shall be capable of supporting without failure at least ten times the maximum intended load.

(g) Hooks on headache ball assemblies, lower load blocks, or other attachment assemblies shall be of a type that can be closed and locked, eliminating the hook throat opening. Alternatively, an alloy anchor type shackle with a bolt, nut and retaining pin may be used.

(h) Bridles and associated rigging for attaching the personnel platform to the hoist line shall be used only for the platform and the necessary employees, their tools and the materials necessary to do their work, and shall not be used for any other purpose when not hoisting personnel.

(6) Personnel platforms - design criteria.

(a) The personnel platform and suspension system shall be designed by a qualified engineer or a qualified person competent in structural design.

(b) The suspension system shall be designed to minimize tipping of the platform due to movement of employees occupying the platform.

(c) The personnel platform itself, except the guardrail system and body harness anchorages, shall be capable of supporting, without failure, its own weight and at least five times the maximum intended load based on a minimum allowance of five hundred pounds for the first person with light tools, and an additional two hundred fifty pounds for each additional person.

(d) Criteria for guardrail systems contained in chapter 296-155 WAC, Part K and body harness anchorages are contained in chapter 296-155 WAC, Part C-1.

(e) The personnel platform shall be conspicuously posted with a plate or other permanent marking which indicates the weight of the platform and its rated load capacity or maximum intended load.

(7) Platform specifications.

(a) Each personnel platform shall be equipped with a guardrail system which meets the requirements of chapter 296-155 WAC Part K and, shall be enclosed at least from the toeboard to mid-rail with either solid construction or

expanded metal having openings no greater than one-half inch (1.27 cm).

(b) A grab rail shall be installed inside the entire perimeter of the personnel platform.

(c) Access gates, if installed, shall not swing outward during hoisting.

(d) Access gates, including sliding or folding gates, shall be equipped with a restraining device to prevent accidental opening.

(e) Headroom shall be provided which allows employees to stand upright in the platform.

(f) In addition to the use of hard hats, employees shall be protected by overhead protection on the personnel platform when employees are exposed to falling objects.

(g) All rough edges exposed to contact by employees shall be surfaced or smoothed in order to prevent injury to employees from punctures or lacerations.

(h) All welding of the personnel platform and its components shall be performed by a qualified welder familiar with the weld grades, types, and material specified in the platform design.

(i) Occupants of all personnel platforms shall wear a safety belt or harness and lanyard which meets the requirements of chapter 296-155 WAC Part C-1.

(j) Box-type platform: The workers lanyard shall be secured to an anchorage within the platform meeting the requirements of chapter 296-155 WAC Part C-1.

(k) Rescue platform:

(i) If the platform is used as a rescue vehicle, the injured worker shall be strapped into the stretcher or basket.

(ii) The basket shall then be secured by lanyard to an anchorage within the platform meeting the requirements of chapter 296-155 WAC Part C-1.

(l) Boatswains chair: The workers lanyard shall be secured to the lift line above the headache ball or to the crane hook itself.

(m) Barrel-type platform:

(i) The workers lanyard shall be secured to the lift line above the headache ball or to the crane hook itself.

(ii) A solid bar or rod shall be substantially attached in a rigid position to the bottom or side of the platform.

(iii) The bottom of the barrel-type platform shall be of a convex shape to cause the platform to lay on its side when lowered to the ground or floor.

(iv) The bar or rod shall extend a minimum of eight feet above the floor of the platform.

(v) Workers shall enter and exit from barrel-type platforms only when they are in an upright position, stable, and securely attached to the load line.

(vi) The employer shall use methods or devices which allow employees to safely enter or exit barrel-type platforms.

(8) Personnel platform loading.

(a) The personnel platform shall not be loaded in excess of its rated load capacity.

(b) The number of employees occupying the personnel platform shall not exceed the number required for the work being performed.

(c) Personnel platforms shall be used only for employees, their tools, and the materials necessary to do their work, and shall not be used to hoist only materials or tools when not hoisting personnel.

(d) Materials and tools for use during a personnel lift shall be secured to prevent displacement.

(e) Materials and tools for use during a personnel lift shall be evenly distributed within the confines of the platform while the platform is suspended.

(9) Trial lift, inspection, and proof testing.

(a) A trial lift with the unoccupied personnel platform loaded at least to the anticipated lightweight shall be made from ground level, or any other location where employees will enter the platform, to each location at which the personnel platform is to be hoisted and positioned. This trial lift shall be performed immediately prior to placing personnel on the platform. The operator shall determine that all systems, controls, and safety devices are activated and functioning properly; that no interferences exist; and that all configurations necessary to reach those work locations will allow the operator to remain under the fifty percent limit of the hoist's rated capacity. Materials and tools to be used during the actual lift can be loaded in the platform, as provided in subsection (8)(d) and (e) of this section for the trial lift. A single trial lift may be performed at one time for all locations that are to be reached from a single set-up position.

(b) The trial lift shall be repeated prior to hoisting employees whenever the crane or derrick is moved and set up in a new location or returned to a previously used location. Additionally, the trial lift shall be repeated when the lift route is changed unless the operator determines that the route change is not significant (i.e., the route change would not affect the safety of hoisted employees).

(c) After the trial lift, and just prior to hoisting personnel, the platform shall be hoisted a few inches and inspected to ensure that it is secure and properly balanced. Employees shall not be hoisted unless the following conditions are determined to exist:

(i) Hoist ropes shall be free of kinks;

(ii) Multiple part lines shall not be twisted around each other;

(iii) The primary attachment shall be centered over the platform; and

(iv) The hoisting system shall be inspected if the load rope is slack to ensure all ropes are properly stowed on drums and in sheaves.

(d) A visual inspection of the crane or derrick, rigging, personnel platform, and the crane or derrick base support or ground shall be conducted by a competent person immediately after the trial lift to determine whether the testing has exposed any defect or produced any adverse effect upon any component or structure.

(e) Any defects found during inspections which create a safety hazard shall be corrected before hoisting personnel.

(f) At each job site, prior to hoisting employees on the personnel platform, and after any repair or modification, the platform and rigging shall be proof tested to one hundred twenty-five percent of the platform's rated capacity by holding it in a suspended position for five minutes with the test load evenly distributed on the platform (this may be done concurrently with the trial lift). After proof testing, a competent person shall inspect the platform and rigging. Any deficiencies found shall be corrected and another proof test shall be conducted. Personnel hoisting shall not be conducted until the proof testing requirements are satisfied.

(10) Work practices.

(a) Employees shall keep all parts of the body inside the platform during raising, lowering, and positioning. This provision does not apply to an occupant of the platform performing the duties of a signal person.

(b) Before employees exit or enter a hoisted personnel platform that is not landed, the platform shall be secured to the structure where the work is to be performed, unless securing to the structure creates an unsafe situation.

(c) Tag lines shall be used unless their use creates an unsafe condition.

(d) The crane or derrick operator shall remain at the controls at all times when the crane engine is running and the platform is occupied.

(e) Hoisting of employees shall be promptly discontinued upon indication of any dangerous weather conditions or other impending danger.

(f) Employees being hoisted shall remain in continuous sight of and in direct communication with the operator or signal person. In those situations where direct visual contact with the operator is not possible, and the use of a signal person would create a greater hazard for that person, direct communication alone such as by radio may be used.

(g) Hand signals to the operator shall be in accordance with WAC 296-155-525 (1)(c).

(h) Except over water, employees occupying the personnel platform shall use a full body harness system with lanyard appropriately attached to the lower load block or overhaul ball, or to a structural member within the personnel platform capable of supporting a fall impact for employees using the anchorage as specified in chapter 296-155 WAC, Part C-1. When working over water, the requirements of WAC 296-155-235 shall apply.

(i) No lifts shall be made on another of the crane's or derrick's load lines while personnel are suspended on a platform.

(11) Traveling.

(a) Hoisting of employees while the crane is traveling is prohibited, except for portal, tower and locomotive cranes, or where the employer demonstrates that there is no less hazardous way to perform the work.

(b) Under any circumstances where a crane would travel while hoisting personnel, the employer shall implement the following procedures to safeguard employees:

(i) Crane travel shall be restricted to a fixed track or runway;

(ii) Travel shall be limited to the load radius of the boom used during the lift; and

(iii) The boom must be parallel to the direction of travel.

(c) A complete trial run shall be performed to test the route of travel before employees are allowed to occupy the platform. This trial run can be performed at the same time as the trial lift required by subsection (9)(a) of this section which tests the route of the lift.

(d) If travel is done with a rubber tired-carrier, the condition and air pressure of the tires shall be checked. The chart capacity for lifts on rubber shall be used for application of the fifty percent reduction of rated capacity. Notwithstanding subsection (3)(e) of this section, outriggers may be partially retracted as necessary for travel.

(12) Prelift meeting.

(a) A meeting attended by the crane or derrick operator, signal person(s) (if necessary for the lift), employee(s) to be lifted, and the person responsible for the task to be performed shall be held to review the appropriate requirements of this section and the procedures to be followed.

(b) This meeting shall be held prior to the trial lift at each new work location, and shall be repeated for any employees newly assigned to the operation.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-24-051, § 296-155-48533, filed 11/27/96, effective 2/1/97. Statutory Authority: Chapter 49.17 RCW. 95-10-016, § 296-155-48533, filed 4/25/95, effective 10/1/95; 94-15-096 (Order 94-07), § 296-155-48533, filed 7/20/94, effective 9/20/94; 91-03-044 (Order 90-18), § 296-155-48533, filed 1/10/91, effective 2/12/91; 90-03-029 (Order 89-20), § 296-155-48533, filed 1/11/90, effective 2/26/90; 89-11-035 (Order 89-03), § 296-155-48533, filed 5/15/89, effective 6/30/89. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-48533, filed 1/21/86.]

WAC 296-155-48536 Forklift elevated work platforms. When a forklift truck is used for elevating workers a platform shall be specifically built for that purpose and shall comply with the following requirements:

(1) The platform shall be securely attached to the forks and shall have standard guardrails and toeboards on all open sides.

(2) The hydraulic system of the forklift shall be so designed that the lift mechanism will not drop faster than one hundred thirty-five feet per minute in the event of a failure in any part of the system. Forklifts used for elevating platforms shall be identified that they are so designed.

(3) A safety strap shall be installed or the control lever shall be locked to prevent the boom from tilting.

(4) An operator shall be at the controls of the forklift equipment while persons are on the platform.

(5) The operator shall be in the normal operating position while raising or lowering the platform.

(6) The vehicle shall not travel from point to point while workers are on the platform except that inching or maneuvering at very slow speed is permissible.

(7) The area between workers on the platform and the mast shall be adequately guarded to prevent contact with chains or other shear points.

(8) All platforms shall be visually inspected daily or before each use by the person in charge of the work being performed, and shall be tested as frequently as is necessary to maintain minimum safety factors.

(9) Whenever a truck, except for high lift order picker trucks, is equipped with vertical hoisting controls elevatable with the lifting carriage or forks, the following precautions shall be taken for the protection of personnel being elevated.

(a) Provide a platform secured to the lifting carriage and/or forks.

(b) Provide means whereby personnel on the platform can shut off power to the truck.

(c) Provide such protection from falling objects as indicated necessary by the operating conditions.

[Statutory Authority: Chapter 49.17 RCW and RCW 49.17.040, [49.17.]050 and [49.17.]060. 92-22-067 (Order 92-06), § 296-155-48536, filed 10/30/92, effective 12/8/92. Statutory Authority: Chapter 49.17 RCW. 89-11-035 (Order 89-03), § 296-155-48536, filed 5/15/89, effective 6/30/89.]

**PART K
FLOOR OPENINGS, WALL OPENINGS AND
STAIRWAYS**

WAC 296-155-500 Definitions applicable to this part. **Floor hole** means an opening measuring less than 12 inches but more than 1 inch in its least dimension in any floor, roof, or platform through which materials but not persons may fall, such as a belt hole, pipe opening, or slot opening.

Floor opening means an opening measuring 12 inches or more in its least dimension in any floor, roof, or platform, through which persons may fall.

Handrail means a rail used to provide employees with a handhold for support.

Low pitched roof means a roof having a slope less than or equal to four in twelve.

Mechanical equipment means all motor or human propelled wheeled equipment except for wheelbarrows, mopcars, robotic thermoplastic welders and robotic crimpers.

Nose, nosing means that portion of a tread projecting beyond the face of the riser immediately below.

Platform means a walking/working surface for persons, elevated above the surrounding floor or ground, such as a balcony or platform for the operation of machinery and equipment.

Riser height means the vertical distance from the top of a tread to the top of the next higher tread or platform/landing or the distance from the top of a platform/landing to the top of the next higher tread or platform/landing.

Roof means the exterior surface on the top of a building. This does not include floors which, because a building has not been completely built, temporarily become the top surface of a building.

Roofing work means the hoisting, storage, application, and removal of roofing materials and equipment, including related insulation, sheet metal, and vapor barrier work, but not including the construction of the roof deck.

Runway means a passageway for persons, elevated above the surrounding floor or ground level, such as a footwalk along shafting or a walkway between buildings.

Safety monitoring system means a safety system in which a competent person monitors the safety of all employees in a roofing crew, and warns them when it appears to the monitor that they are unaware of the hazard or are acting in an unsafe manner. The competent person must be on the same roof and within visual distance of the employees, and must be close enough to verbally communicate with the employees.

Stair platform means an extended step or landing breaking a continuous run of stairs.

Stairrail system means a vertical barrier erected along the unprotected sides and edges of a stairway to prevent employees from falling to lower levels. The top surface of a stairrail system may also be a "handrail."

Stairs, stairways means a series of steps leading from one level or floor to another, or leading to platforms, pits, boiler rooms, crossovers, or around machinery, tanks, and other equipment that are used more or less continuously or routinely by employees or only occasionally by specific

individuals. For the purpose of this part, a series of steps and landings having three or more rises constitutes stairs or stairway.

Standard railing means a vertical barrier erected along exposed edges of a floor opening, wall opening, ramp, platform, or runway to prevent falls of persons.

Standard strength and construction means any construction of railings, covers, or other guards that meets the requirements of this part.

Toeboard means a vertical barrier at floor level erected along exposed edges of a floor opening, wall opening, platform, runway, or ramp to prevent falls of materials.

Tread depth means the horizontal distance from front to back of tread (excluding nosing, if any).

Unprotected side or edge means any side or edge of a roof perimeter where there is no wall three feet (.9 meters) or more in height.

Wall opening means an opening at least 30 inches high and

18 inches wide, in any wall or partition, through which persons may fall, such as an opening for a window, a yard arm doorway or chute opening.

Work area means that portion of a roof where roofing work is being performed.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-24-051, § 296-155-500, filed 11/27/96, effective 2/1/97. Statutory Authority: Chapter 49.17 RCW. 95-10-016, § 296-155-500, filed 4/25/95, effective 10/1/95; 91-24-017 (Order 91-07), § 296-155-500, filed 11/22/91, effective 12/24/91; 91-03-044 (Order 90-18), § 296-155-500, filed 1/10/91, effective 2/12/91. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-500, filed 1/21/86. Statutory Authority: RCW 49.17.040, 49.17.050 and 49.17.240. 81-13-053 (Order 81-9), § 296-155-500, filed 6/17/81; Order 74-26, § 296-155-500, filed 5/7/74, effective 6/6/74.]

WAC 296-155-505 Guardrails, handrails and covers. (1) General provisions. This part applies to temporary or emergency conditions where there is danger of employees or materials falling through floor, roof, or wall openings, or from stairways, runways, ramps, open sided floors, open sides of structures, bridges, or other open sided walking or working surfaces. When guardrails or covers required by this section must be temporarily removed to perform a specific task, the area shall be constantly attended by a monitor to warn others of the hazard or shall be protected by a movable barrier.

(2) Guarding of floor openings and floor holes.

(a) Floor openings shall be guarded by a standard railing and toe boards or cover, as specified in subsections (2)(g) and (5) of this section. In general, the railing shall be provided on all exposed sides, except at entrances to stairways. All vehicle service pits shall have a cover or removable type standard guardrail. When not in use, pits shall be covered or guarded. Where vehicle service pits are to be used again immediately, and the service person is within a 50 foot distance of the unguarded pit and also within line of sight of the unguarded pit, the cover or guardrail need not be replaced between uses. Where vehicle service pits are used frequently, the perimeters of the pits shall be delineated by high visibility, luminescent, skid resistant paint. Such painted delineation shall be kept clean and free of extraneous materials.

(b) Ladderway floor openings or platforms shall be guarded by standard railings with standard toe boards on all exposed sides, except at entrance to opening, with the passage through the railing either provided with a swinging gate or so offset that a person cannot walk directly into the opening.

(c) Hatchways and chute floor openings shall be guarded by one of the following:

(i) Hinged covers of standard strength and construction and a standard railing with only one exposed side. When the opening is not in use, the cover shall be closed or the exposed side shall be guarded at both top and intermediate positions by removable standard railings;

(ii) A removable standard railing with toe board on not more than two sides of the opening and fixed standard railings with toe boards on all other exposed sides. The removable railing shall be kept in place when the opening is not in use and shall be hinged or otherwise mounted so as to be conveniently replaceable.

(d) Wherever there is danger of falling through a skylight opening, and the skylight itself is not capable of sustaining the weight of a two hundred pound person with a safety factor of four, standard guardrails shall be provided on all exposed sides or the skylight shall be covered in accordance with (g) of this subsection.

(e) Pits and trap door floor openings shall be guarded by floor opening covers of standard strength and construction. While the cover is not in place, the pit or trap openings shall be protected on all exposed sides by removable standard railings.

(f) Manhole floor openings shall be guarded by standard covers which need not be hinged in place. While the cover is not in place, the manhole opening shall be protected by standard railings.

(g) All floor opening or hole covers shall be capable of supporting the maximum potential load but never less than two hundred pounds (with a safety factor of four).

(i) All covers shall be secured when installed so as to prevent accidental displacement by the wind, equipment, or employees.

(ii) All covers shall be color coded or they shall be marked with the word "hole" or "cover" to provide warning of the hazard.

(iii) If it becomes necessary to remove the cover, a monitor shall remain at the opening until the cover is replaced. The monitor shall advise persons entering the area of the hazard, shall prevent exposure to the fall hazard and shall perform no other duties.

(h) Floor holes, into which persons can accidentally walk, shall be guarded by either a standard railing with standard toe board on all exposed sides, or a floor hole cover of standard strength and construction that is secured against accidental displacement. While the cover is not in place, the floor hole shall be protected by a standard railing.

(3) Guarding of wall openings.

(a) Wall openings, from which there is a drop of more than 4 feet, and the bottom of the opening is less than 3 feet above the working surface, shall be guarded as follows:

(i) When the height and placement of the opening in relation to the working surface is such that either a standard rail or intermediate rail will effectively reduce the danger of falling, one or both shall be provided;

(ii) The bottom of a wall opening, which is less than 4 inches above the working surface, regardless of width, shall be protected by a standard toe board or an enclosing screen either of solid construction or as specified in subsection (5)(e)(ii) of this section.

(b) An extension platform, outside a wall opening, onto which materials can be hoisted for handling shall have standard guardrails on all exposed sides or equivalent. One side of an extension platform may have removable railings in order to facilitate handling materials.

(c) When a chute is attached to an opening, the provisions of (a) of this subsection shall apply, except that a toe board is not required.

(4) Guarding of open sided surfaces.

(a) Every open sided floor, platform or surface four feet or more above adjacent floor or ground level shall be guarded by a standard railing, or the equivalent, as specified in subsection (5)(a) of this section, on all open sides, except where there is entrance to a ramp, stairway, or fixed ladder. The railing shall be provided with a standard toe board wherever, beneath the open sides, persons can pass, or there is moving machinery, or there is equipment with which falling materials could create a hazard.

(b) Runways shall be guarded by a standard railing, or the equivalent, as specified in subsection (5) of this section, on all open sides, 4 feet or more above the floor or ground level. Wherever tools, machine parts, or materials are likely to be used on the runway, a toe board shall also be provided on each exposed side.

(c) Runways used exclusively for special purposes may have the railing on one side omitted where operating conditions necessitate such omission, providing the falling hazard is minimized by using a runway not less than 18 inches wide.

(d) Where employees entering upon runways become thereby exposed to machinery, electrical equipment, or other danger not a falling hazard, additional guarding shall be provided.

(e) Regardless of height, open sided floors, walkways, platforms, or runways above or adjacent to dangerous equipment, pickling or galvanizing tanks, degreasing units, and similar hazards, shall be guarded with a standard railing and toe board.

(f) Open sides of gardens, patios, recreation areas and similar areas located on roofs of buildings or structures shall be guarded by permanent standard railings or the equivalent. Where a planting area has been constructed adjacent to the open sides of the roof and the planting area is raised above the normal walking surface of the roof area, the open side of the planting area shall also be protected with standard railings or the equivalent.

(5) Standard specifications.

(a) A standard railing shall consist of top rail, intermediate rail, toe board, and posts, and shall have a vertical height of 36 inches to 42 inches from upper surface of top rail to floor, platform, runway, or ramp level. Each length of lumber shall be smooth surfaced throughout the length of the railing. The intermediate rail shall be halfway between the top rail and the floor, platform, runway, or ramp. The ends of the rails shall not overhang the terminal posts except where such overhang does not constitute a projection hazard.

Minimum requirements for standard railings under various types of construction are specified in the following items:

(i) For wood railings, the posts shall be of at least 2 inch by 4 inch stock spaced not to exceed 8 feet; the top rail shall be of at least 2 inch by 4 inch stock; the intermediate rail shall be of at least 1 inch by 6 inch stock.

(ii) For pipe railings, posts and top and intermediate railings shall be at least 1 1/2 inches nominal OD diameter with posts spaced not more than 8 feet on centers.

(iii) For structural steel railings, posts and top and intermediate rails shall be of 2 inch by 2 inch by 3/8 inch angles or other metal shapes of equivalent bending strength, with posts spaced not more than 8 feet on centers.

(iv) For wire rope railings, the top and intermediate railings shall be at least 1/2 inch fibre core rope, or the equivalent to meet strength factor and deflection of (a)(v) of this subsection. Posts shall be spaced not more than 8 feet on centers. The rope shall be stretched taut, so as to present a minimum deflection.

(v) The anchoring of posts and framing of members for railings of all types shall be of such construction that the completed structure shall be capable of withstanding a load of at least 200 pounds applied in any direction at any point on the top rail, with a minimum of deflection.

(vi) Railings receiving heavy stresses from employees trucking or handling materials shall be provided additional strength by the use of heavier stock, closer spacing of posts, bracing, or by other means.

(vii) Other types, sizes, and arrangements of railing construction are acceptable, provided they meet the following conditions:

(A) A smooth surfaced top rail at a height above floor, platform, runway, or ramp level of between 36 inches and 42 inches;

(B) A strength to withstand at least the minimum requirement of 200 pounds top rail pressure with a minimum of deflection;

(C) Protection between top rail and floor, platform, runway, ramp, or stair treads, equivalent at least to that afforded by a standard intermediate rail;

(D) Elimination of overhang of rail ends unless such overhang does not constitute a hazard.

(b)(i) A standard toe board shall be 4 inches minimum in vertical height from its top edge to the level of the floor, platform, runway, or ramp. It shall be securely fastened in place and have not more than 1/4 inch clearance above floor level. It may be made of any substantial material, either solid, or with openings not over 1 inch in greatest dimension.

(ii) Where material is piled to such height that a standard toe board does not provide protection, paneling, or screening from floor to intermediate rail or to top rail shall be provided.

(c) Floor opening covers shall be of any material that meets the following strength requirements:

(i) Conduits, trenches, and manhole covers and their supports, when located in roadways, and vehicular aisles shall be designed to carry a truck rear axle load of at least 2 times the maximum intended load;

(ii) All floor opening covers shall be capable of supporting the maximum potential load but never less than two hundred pounds (with a safety factor of four).

(A) All covers shall be secured when installed so as to prevent accidental displacement by the wind, equipment, or employees.

(B) All covers shall be color coded or they shall be marked with the word "hole" or "cover" to provide warning of the hazard.

(C) If it becomes necessary to remove the cover, a monitor shall remain at the opening until the cover is replaced. The monitor shall advise persons entering the area of the hazard, shall prevent exposure to the fall hazard and shall perform no other duties.

(d) Skylight openings that create a falling hazard shall be guarded with a standard railing, or covered in accordance with (c)(ii) of this subsection.

(e) Wall opening protection shall meet the following requirements:

(i) Barriers shall be of such construction and mounting that, when in place at the opening, the barrier is capable of withstanding a load of at least 200 pounds applied in any direction (except upward), with a minimum of deflection at any point on the top rail or corresponding member.

(ii) Screens shall be of such construction and mounting that they are capable of withstanding a load of at least 200 pounds applied horizontally at any point on the near side of the screen. They may be of solid construction of grill work with openings not more than 8 inches long, or of slat work with openings not more than 4 inches wide with length unrestricted.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-24-051, § 296-155-505, filed 11/27/96, effective 2/1/97. Statutory Authority: Chapter 49.17 RCW. 95-10-016, § 296-155-505, filed 4/25/95, effective 10/1/95; 94-15-096 (Order 94-07), § 296-155-505, filed 7/20/94, effective 9/20/94; 91-24-017 (Order 91-07), § 296-155-505, filed 11/22/91, effective 12/24/91; 91-03-044 (Order 90-18), § 296-155-505, filed 1/10/91, effective 2/12/91; 90-03-029 (Order 89-20), § 296-155-505, filed 1/11/90, effective 2/26/90. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-505, filed 1/21/86. Statutory Authority: RCW 49.17.040, 49.17.050 and 49.17.240. 81-13-053 (Order 81-9), § 296-155-505, filed 6/17/81; Order 76-29, § 296-155-505, filed 9/30/76; Order 74-26, § 296-155-505, filed 5/7/74, effective 6/6/74.]

WAC 296-155-50503 Roofing brackets. (1) Roofing brackets shall be constructed to fit the pitch of the roof.

(2) Securing: Brackets shall be secured in place by nailing in addition to the pointed metal projections. When it is impractical to nail brackets, rope supports shall be used. When rope supports are used, they shall consist of first grade manila of at least 3/4 inch diameter, or equivalent.

(3) Crawling boards or chicken ladders.

(a) Crawling boards shall be not less than ten inches wide and one inch thick, having cleats 1 x 1 1/2 inches.

(i) The cleats shall be equal in length to the width of the board and spaced at equal intervals not to exceed twenty-four inches.

(ii) Nails shall be driven through and clinched on the underside.

(iii) The crawling board shall extend from the ridge pole to the eaves when used in connection with roof construction, repair, or maintenance.

(b) A firmly fastened lifeline of at least 3/4 inch diameter rope, or equivalent, shall be strung beside each crawling board for a handhold.

(c) Crawling boards shall be secured to the roof by means of adequate ridge hooks or other effective means.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-24-051, § 296-155-50503, filed 11/27/96, effective 2/1/97. Statutory Authority: Chapter 49.17 RCW. 95-10-016, § 296-155-50503, filed 4/25/95, effective 10/1/95; 91-03-044 (Order 90-18), § 296-155-50503, filed 1/10/91, effective 2/12/91. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-50503, filed 1/21/86.]

WAC 296-155-50505 Reserved.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-50505, filed 7/20/94, effective 9/20/94; 91-24-017 (Order 91-07), § 296-155-50505, filed 11/22/91, effective 12/24/91. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-50505, filed 1/21/86.]

WAC 296-155-510 Reserved.

[Statutory Authority: Chapter 49.17 RCW. 91-24-017 (Order 91-07), § 296-155-510, filed 11/22/91, effective 12/24/91; 89-11-035 (Order 89-03), § 296-155-510, filed 5/15/89, effective 6/30/89. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-510, filed 1/21/86; Order 74-26, § 296-155-510, filed 5/7/74, effective 6/6/74.]

WAC 296-155-515 Ramps, runways, and inclined walkways. (1) Width. Ramps, runways and inclined walkways shall be eighteen inches or more wide.

(2) Standard railings. Ramps, runways and inclined walkways shall be provided with standard railings when located four feet or more above ground or floor level.

(3) Ramp specifications. Ramps, runways and walkways shall not be inclined more than twenty degrees from horizontal and when inclined shall be cleated or otherwise treated to prevent a slipping hazard on the walking surface.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-24-051, § 296-155-515, filed 11/27/96, effective 2/1/97. Statutory Authority: Chapter 49.17 RCW. 95-10-016, § 296-155-515, filed 4/25/95, effective 10/1/95. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-515, filed 1/21/86.]

PART L

CRANES, DERRICKS, HOISTS, ELEVATORS, AND CONVEYORS

WAC 296-155-525 Cranes and derricks. (1) Definitions applicable to this part:

Accessory - a secondary part or assembly of parts which contributes to the overall function and usefulness of a machine.

Administrative or regulatory authority - a governmental agency, or the employer in the absence of governmental jurisdiction.

Angle indicator (boom) - an accessory which measures the angle of the boom to the horizontal.

Appointed - assigned specific responsibilities by the employer or the employer's representative.

Authorized person - means a person approved or assigned by the employer to perform a specific type of duty or duties or be at a specific location or locations at the workplace.

Auxiliary hoist - a secondary hoist rope system used either in conjunction with, or independently of, the main hoist system.

Axis of rotation - the vertical axis around which the crane superstructure rotates.

Axle - the shaft or spindle with which or about which a wheel rotates. On wheel-mounted cranes it refers to a type of axle assembly including housings, gearing, differential, bearings, and mounting appurtenances.

Axle (bogie) - two or more axles mounted in tandem in a frame so as to divide the load between the axles and permit vertical oscillation of the wheels.

Ballast - weight used to supplement the weight of the machine in providing stability for lifting working loads (the term **ballast** is normally associated with locomotive cranes).

Base, anchor bolt - a crane base that is bolted to a footing.

Base, expendable - for static-mounting cranes, a style of bottom mast section or member that is cast into a concrete footing block; all or part of this component is lost to future installations.

Base, fixed - a crane base that does not travel. It may be expendable, knee braced, or anchor bolted.

Base (mounting) - the traveling base on which the rotating superstructure of a locomotive or crawler crane is mounted.

Base, tower crane - the lowermost supporting component of the crane.

Base, travel - a crane base that is a ballasted platform mounted on trucks that ride along rails.

Boom (crane) - a member hinged at the rotating superstructure and used for supporting the existing tackle.

Boom angle - the angle above or below horizontal of the longitudinal axis of the base boom section.

Boom hoist mechanism - means for supporting the boom and controlling the boom angle.

Boom point - the outer extremity of the crane boom, containing the hoist sheave assembly.

Boom point sheave assembly - an assembly of sheaves and pin built as an integral part of the boom point.

Boom stop - a device used to limit the angle of the boom at the highest recommended position.

Brake - a device used for retarding or stopping motion.

Brace, tower - a structural attachment placed between a crane tower and an adjacent structure to pass loads to the adjacent structure and permit the crane to be erected to greater than free standing height.

Buffer - an energy absorbing device for reducing impact when a moving crane or trolley reaches the end of its permitted travel.

Cab - a housing which covers the rotating superstructure machinery, or the operator's or driver's station.

Climbing frame - a frame used with climbing cranes to transmit operational and climbing reactions to the host building frame.

Climbing ladder - a steel member with crossbars (used in parts) suspended from a climbing frame and used as jacking support points when some cranes climb.

Clutch - a means for engagement or disengagement of power.

Commercial truck vehicle - a commercial motor vehicle designed primarily for the transportation of property in connection with business and industry.

Counterweight - weight used to supplement the weight of the machine in providing stability for lifting working loads.

Counterweight jib - a horizontal member of a crane on which the counterweights and usually the hoisting machinery are mounted.

Crane carrier - the undercarriage of a wheel-mounted crane specifically designed for transporting the rotating crane superstructure. It may or may not provide its own travel mechanism. It is distinguished from a commercial truck vehicle in that it is not designed to transport personnel, materials, or equipment other than the crane-rotating superstructure.

Cross-over points - in multiple layer spooling of rope on a drum, those points of rope contact where the rope crosses the preceding rope layer.

Designated - selected or assigned by the employer or the employer's representative as being competent to perform specific duties.

Drum - the cylindrical member around which a rope is wound for lifting and lowering the load or boom.

Dynamic (loading) - loads introduced into the machine or its components due to accelerating or decelerating forces.

Flange point - a point of contact between rope and drum flange where the rope changes layers.

Free standing height - that height of a crane which is supported by the tower (mast) alone without assistance from braces, guys, or other means.

Gage, track - the horizontal distance between two rails measured perpendicular to the direction of travel.

Gantry (A-frame) - a structural frame, extending above the superstructure, to which the boom support ropes are reeved.

High strength (traction) bolts - high strength tensile bolts used in the assembly of crane sections. The bolts are installed in tension by torquing or other means at a level greater than that produced by in- or out-of-service loads for the purpose of reducing the likelihood of bolt fatigue failure.

Hoist mechanism - a hoist drum and rope reeving system used for lifting and lowering loads.

Jib - an extension attached to the boom point to provide added boom length for lifting specified loads. The jib may be in line with the boom or offset to various angles in the vertical plane of the boom.

Jib backstop - a device which will restrain the jib from turning over backward.

Job site - work area defined by the construction contract.

Limiting device - a mechanical device which is operated by some part of a power driven machine or equipment to control loads or motions of the machine or equipment.

Load (working) - the external load in pounds (kilograms) applied to the crane, including the weight of load-attaching equipment such as lower load block, shackles, and slings.

Load block, lower - the assembly of hook or shackle, swivel, sheaves, pins, and frame suspended by the hoisting ropes.

Load block, upper - the assembly of shackle, swivel, sheaves, pins, and frame suspended from the boom point.

Load ratings - crane ratings in pounds (kilograms) established by the manufacturer.

Mast (boom) - a frame hinged at or near the boom hinge for use in connection with supporting a boom. The head of the mast is usually supported and raised or lowered by the boom hoist ropes.

Mast (jib) - a frame hinged at or near the boom point for use in connection with supporting a jib.

Normal operating conditions.

Cab- or station-operated cranes - conditions during which a crane is performing functions within the manufacturer's operating recommendations. Under these conditions, the operator is at the operating control devices on the crane, and no other persons except those appointed are to be on the crane.

Ground- or floor-operated cranes - conditions during which a crane is performing functions within the manufacturer's operating recommendations. Under these conditions, the operator is at the operating control devices that are mounted to the crane but operated with the operator off the crane, and no other persons except those appointed are to be on the crane.

Remote-operated cranes - conditions during which a crane is performing functions within the manufacturer's operating recommendations. Under these conditions, the operator is at the operating control devices that are mounted to any part of the crane, and no other persons except those appointed are to be on the crane.

Out-of-service - the condition of a crane when unloaded, without power and with the controls unattended and prepared to endure winds above the in-service level.

Outriggers - extendable or fixed members attached to the mounting base, which rest on supports at the outer ends used to support the crane.

Pawl (dog) - a device for positively holding a member against motion in one or more directions.

Payload - that load or loads being transported by the commercial truck chassis from place to place.

Pendant - a rope or strand of specified length with fixed end connections.

Pitch diameter - the diameter of a sheave or rope drum measured at the center line of the rope.

Power-controlled lowering - a system or device in the power train, other than the load hoist brake, which can control the lowering rate of speed of the load hoist mechanism.

Qualified person - a person who, by possession of a recognized degree or certificate of professional standing, or who, by extensive knowledge, training, and experience, has successfully demonstrated the ability to solve or resolve problems relating to the subject matter and work.

Radius (load) - the horizontal distance from a projection of the axis of rotation to the base of the crane, before loading, to the center of the vertical hoist line or tackle with load applied.

Rail clamp - a tong-like metal device mounted on a locomotive crane car, which can be connected to the track.

Reeving - a rope system in which the rope travels around drums and sheaves.

Remote control station - a location, not on the crane, from which the operator can control all the crane movements.

Repetitive pickup point - when operating on a short cycle operation, the rope being used on a single layer and being spooled repetitively over a short portion of the drum.

Rope - refers to wire rope unless otherwise specified.

Rotation resistant rope - a wire rope consisting of an inner layer of strand laid in one direction covered by a layer of strand laid in the opposite direction. This has the effect of counteracting torque by reducing the tendency of the finished rope to rotate.

Running rope - a rope which travels around sheaves or drums.

Shall - this word indicates that the rule is mandatory and must be followed.

Service, light - service that involves irregular operation with loads generally about one-half or less of the rated load; a service crane at a storage yard or building site would be an example.

Service, normal - service that involves operating occasionally at rated load but normally at less than eighty-five percent of the rated load and not more than ten lift cycles per hour except for isolated instances; a crane used for concrete placement at a building site would be an example.

Service, heavy - service that involves operating at eighty-five percent to one hundred percent of the rated load or in excess of ten lift cycles per hour as a regular specified procedure; some cranes operating at material yards or in industrial applications may fall into this category.

Sheave - a grooved wheel or pulley used with a rope to change the direction and point of application of a pulling force.

Should - this word indicates that the rule is a recommendation, the advisability of which depends on the facts in each situation.

Side loading - a load applied to an angle to the vertical plane of the boom.

Stabilizer - stabilizers are extendable or fixed members attached to the mounting base to increase the stability of the crane, but which may not have the capability of relieving all of the weight from wheels or tracks.

Standby crane - a crane which is not in regular service but which is used occasionally or intermittently as required.

Standing (guy) rope - a supporting rope which maintains a constant distance between the points of attachment to the two components connected by the rope.

Structural competence - the ability of the machine and its components to withstand the stresses imposed by applied loads.

Superstructure - the rotating upper frame structure of the machine and the operating machinery mounted thereon.

Swing - rotation of the superstructure for movement of loads in a horizontal direction about the axis of rotation.

Swing mechanism - the machinery involved in providing rotation of the superstructure.

Swivel - a load carrying member with thrust bearings to permit rotation under load in a plane perpendicular to the direction of the load.

Swiveling - the rotation of the load attachment portion (hook or shackle) of a load block (lower) or hook assembly about its axis of suspension in relation to the load line(s).

Tackle - an assembly of ropes and sheaves arranged for lifting, lowering, or pulling.

Telescoping boom - consists of a base boom from which one or more boom sections are telescoped for additional length.

Telescoping (tower crane) - a process whereby the height of a traveling or fixed base crane is increased typically by raising the inner tower and then adding sections at the top of the outer tower; there are also cranes that are telescoped by adding to the inner tower from below.

Tower (mast) - a vertical structural frame consisting of columns and bracing capable of supporting an upperstructure with its working and dynamic loads and transmitting them to the supporting surface or structure.

Traction (high strength) bolts - see high strength bolts.

Transit - the moving or transporting of a crane from one job site to another.

Travel - the function of the machine moving under its own power from one location to another on a job site.

Trolley - the device that travels along the load jib and contains the upper load block.

Two-blocking - the condition in which the lower load block or hook assembly comes in contact with the upper load block or boom point sheave assembly.

Weathervaning - wind induced rotation of a crane upperstructure, when out-of-service, to expose minimal surface area to the wind.

Wedge - a tapered wood or steel device used to provide stability to cranes during use as a climber. When the wedges are tightened against the four main legs of the tower, they convert overturning moments into horizontal forces to be resisted by the floor framing or slab.

Wheel base - the distance between centers of front and rear axles. For a multiple axle assembly the axle center for wheel base measurement is taken as the midpoint of the assembly.

Whipline (runner or auxiliary) - a secondary rope system usually of lighter load capacity than that provided by the main rope system.

Winch head - a power driven spool for handling of loads by means of friction between fiber or wire rope and the spool.

(2) General requirements.

(a) The employer shall comply with the manufacturer's specifications and limitations applicable to the operation of any and all cranes and derricks. Where manufacturer's specifications are not available the limitations assigned to the equipment shall be based on the determinations of a qualified engineer, competent in this field and such determinations will be appropriately documented and recorded. Attachments used with cranes shall not exceed the capacity, rating, or scope recommended by the manufacturer.

(b) Rated load capacities, and recommended operating speeds, and special hazard warnings, or instruction, shall be conspicuously posted on all equipment. Instructions or warnings shall be visible to the operator while at the control station.

(c) Hand signals to crane and derrick operators shall be those prescribed by the applicable ANSI standard for the type of crane in use. An illustration of the signals shall be posted at the job site.

(d) The employer shall designate a competent person who shall inspect all machinery and equipment prior to each use, and periodically during use to make sure it is in safe

operating condition. Any deficiencies shall be repaired, or defective parts replaced, before continued use.

(e) A thorough, annual inspection of the hoisting machinery shall be made by a competent person, or by a government or private agency recognized by the department. The employer shall maintain a permanent record of the dates and results of all inspections for each hoisting machine and piece of equipment.

(f) A tag line or guide rope shall be used on all loads that swing freely. Guide ropes or tag lines shall be held by experienced persons.

(g) Care shall be taken to guard against injury to workers, or damage to scaffolds or buildings, from swinging loads.

(h) The operator shall avoid carrying loads over people.

(i) When work is stopped or when the derrick is not in operation, the boom shall be lowered to a horizontal position or tied in place to prevent it whipping with the wind or other external force.

(j) Only authorized personnel shall make sling hitches on loads.

(k) Workers shall not be allowed to ride on loads handled by derricks.

(l) Operators shall observe signals only from duly authorized persons. Under no circumstances shall a load be moved until the signal is received from authorized personnel.

(m) Belts, gears, shafts, pulleys, sprockets, spindles, drums, fly wheels, chains, or other reciprocating, rotating, or other moving parts or equipment shall be guarded if such parts are exposed to contact by employees, or otherwise create a hazard. Guarding shall meet the requirements of chapter 296-24 WAC.

(n) A minimum distance of thirty inches clearance shall be maintained between the swing radius of the greatest extension of the crane superstructure or counterweights and a stationary object, including the crane itself, while the crane is in operation. When this clearance cannot be maintained, suitable barricades or safeguards shall be used to isolate the pinch point hazard area.

(o) All exhaust pipes shall be guarded or insulated where contact by employees, in the performance of normal duties, is possible.

(3) Additional requirements.

(a) Whenever internal combustion engine powered equipment exhausts in enclosed spaces, tests shall be made and recorded to see that employees are not exposed to unsafe concentrations of toxic gases or oxygen deficient atmospheres. (See chapter 296-62 WAC, the general occupational health standards and other applicable standards.)

(b) All cab glazing shall be safety glazing material. Windows shall be provided in the front and on both sides of the cab or operator's compartment with visibility forward and to either side. Visibility forward shall include a vertical range adequate to cover the boom point at all times. The front window may have a section which can be readily removed or held open, if desired. If the section is of the type held in the open position, it shall be secured to prevent inadvertent closure. A windshield wiper should be provided on the front window.

(c)(i) Where necessary for rigging or service requirements, a ladder or steps shall be provided to give access to a cab roof.

(ii) On cranes, guardrails, handholds and steps shall be provided for easy access to the car and cab in accordance with chapter 296-155 WAC, Part C-1 and Part J.

(iii) Platforms and walkways shall have anti-skid surfaces.

(d) Fuel tank filler pipe shall be located in such a position, or protected in such manner, as to not allow spill or overflow to run onto the engine, exhaust, or electrical equipment of any machine being fueled.

(i) An accessible fire extinguisher of 5BC rating, or higher, shall be available at all operator stations or cabs of equipment.

(ii) All fuels shall be transported, stored, and handled to meet the rules of Part D of this chapter. When fuel is transported by vehicles on public highways, department of transportation rules concerning such vehicular transportation are considered applicable.

(e) Except where electrical distribution and transmission lines have been deenergized and visibly grounded at point of work or where insulating barriers, not a part of or an attachment to the equipment or machinery, have been erected to prevent physical contact with the lines, equipment or machines shall be operated proximate to power lines only in accordance with the following:

(i) For lines rated 50 kV. or below, minimum clearance between the lines and any part of the crane or load shall be 10 feet;

(ii) For lines rated over 50 kV., minimum clearance between the lines and any part of the crane or load shall be 10 feet plus 0.4 inch for each 1 kV. over 50 kV., or twice the length of the line insulator, but never less than 10 feet;

(iii) In transit with no load and boom lowered, the equipment clearance shall be a minimum of 4 feet for voltages less than 50 kV., and 10 feet for voltages over 50 kV. up to and including 345 kV., and 16 feet for voltages up to and including 750 kV;

(iv) A person shall be designated to observe clearance of the equipment and give timely warning to insure that the required separation is maintained for all operations where it is difficult for the operator to maintain the desired clearance by visual means;

(v) Cage-type boom guards, insulating links, or proximity warning devices may be used on cranes, but the use of such devices shall not alter the requirements of any other regulation of this part even if such device is required by law or regulation;

(vi) Any overhead wire shall be considered to be an energized line unless and until the person owning such line or the electrical utility authorities indicate that it is not an energized line and it has been visibly grounded;

(vii) Prior to work near transmitter tower where an electrical charge can be induced in the equipment or materials being handled, the transmitter shall be deenergized or tests shall be made to determine if electrical charge is induced on the crane.

(f) The following precautions shall be taken when necessary to dissipate induced voltage:

(i) The equipment shall be provided with an electrical ground directly to the upper rotating structure supporting the boom; and

(ii) Ground jumper cables shall be attached to materials being handled by boom equipment when electrical charge is

induced while working near energized transmitters. Crews shall be provided with nonconductive poles having large alligator clips or other similar protection to attach the ground cable to the load.

(iii) Combustible and flammable materials shall be removed from the immediate area prior to operations.

(g) No modifications or additions which affect the capacity or safe operation of the equipment shall be made by the employer without the manufacturer's or a qualified engineer's written approval. If such modifications or changes are made, the capacity, operation, and maintenance instruction plates, tags, or decals, shall be changed accordingly. In no case shall the original safety factor of the equipment be reduced.

(h) The employer shall comply with Power Crane and Shovel Association, Mobile Hydraulic Crane Standard No. 2.

(i) Sideboom cranes mounted on wheel or crawler tractors shall meet the requirements of SAE J743a-1964.

(4) Crawler, locomotive, and truck cranes.

(a) All jibs shall have positive stops to prevent their movement of more than 5° above the straight line of the jib and boom on conventional type crane booms. The use of cable type belly slings does not constitute compliance with this standard.

(b) All crawler, truck or locomotive cranes in use shall meet the applicable requirements for design, inspection, construction, testing, maintenance and operation as prescribed in the ANSI B30.5-1989, Safety Code for Crawler, Locomotive and Truck Cranes.

(5) Tower cranes.

(a) Tower cranes shall be erected, jumped and dismantled under the immediate supervision of a competent person, designated by the employer.

(b) Tower cranes shall be erected, maintained and used in accordance with the manufacturer's specifications, recommendations and procedures. All modifications shall be approved by the manufacturer and engineered by a professional engineer. The safety factors shall not be reduced by any modifications. The crane plates and charts shall be changed to reflect any modifications made.

(c) A professional engineer shall certify that the crane foundations and underlying soil are adequate support for the tower crane with its maximum overturning movement.

(d) Tower cranes shall be positioned whereby they can swing 360° without either the counterweight or jib striking any building, structure or other object, except:

(i) If the crane can strike an object or another crane, suitable limit switches shall be installed which will prohibit contact with such objects, or;

(ii) Direct voice communications shall be established between any operator of the tower crane(s) involved and a signalperson so stationed where the boom and/or counterweight movement, and the object with which it may contact can be observed so that the operator(s) can be warned of imminent danger.

(iii) A secondary means of positive communications shall be established as a back-up for possible direct voice communication failure.

(iv) Radio communication systems without tone coded squelch are prohibited. Citizens band radios shall not be used as a means of communications for tower cranes.

(e) Prior to installing a climbing tower crane within an existing building or new construction, a structural engineer shall certify that the building is designed to withstand the torque and floor loading created by the crane to be installed.

(f) Tower cranes erected on a new foundation shall be tested in accordance with ANSI B30.3-1990 Chapter 3-1.

(i) The test shall consist of suspending a load of not less than 110% of the rated capacity for 15 minutes. The load shall be suspended from the furthest point of the length of boom (jib) to be used. The results of this test shall be within the manufacturer's recommendations and/or specifications.

(ii) A record of each test shall be made and signed by the person responsible for conducting the test. Such records shall be maintained on the construction site for the duration of the construction work for which it was erected and subsequently made a part of the firm's permanent equipment records. Records shall be made available to authorized representatives of the department, upon request.

(g) A capacity chart shall be furnished by each crane manufacturer which shall include a full and complete range of crane load ratings at all stated operating radii for each allowable speed and each recommended counterweight load.

(i) Such chart shall be posted in the operator's cab or at the remote control stand in use. In lieu of the chart at the remote control stand, a minimum of two weight capacity signs shall be affixed to the jib or boom.

(ii) The chart shall be visible and readable to the operator while at the normal operating position.

(h) Operating controls shall be properly marked to indicate the function of the controls in each position.

(i) An operating and maintenance manual written in the English language shall be provided with each tower crane.

(j) Limit switches shall be installed and shall be kept properly adjusted. They shall be protected or isolated in a manner which will prevent unauthorized tampering. Limit switches shall provide the following functions:

(i) Safely limit the travel of the trolley to prevent it from hitting the outer end of the jib.

(ii) Limit the upward travel of the load block to prevent two-blocking.

(iii) Lower over travel limiting devices shall be provided for all load hoists where the hook area is not visible to the operator.

(iv) Limit the load being lifted in a manner whereby no more than 110% of the maximum rated load can be lifted or moved.

(k) The crane shall not be used to pull vehicles of any type, remove piling, loosen form work, pull away loads which are attached to the ground or walls, or for any operation other than the proper handling of freely suspended loads.

(l) When the operator may be exposed to the hazard of falling objects, the tower crane cab and/or remote control station shall have adequate overhead protection.

(m) The operator shall be protected from the weather. If enclosed cabs are provided they shall provide clear visibility in all directions and glass shall be approved safety glass or the equivalent.

(n) An approved and safe means shall be provided for access to operator's cab and machinery platform.

(o) When necessary for inspection or maintenance purposes, ladders, walkways with railing or other devices shall be provided.

(p) Each tower crane shall be provided with a slewing brake capable of preventing the jib or boom from rotating in either direction and stopping the rotation of the jib or boom while loaded, when desired. Such brake shall have a holding device which, when set, will hold the jib or boom in a fixed location without additional attention of the operator. When the crane is out of operation, the jib or boom shall be pointed downwind and the slewing brake shall be released so as to permit the jib or boom to weathervane, providing the jib or boom has a clear 360 degree rotation. Where a 360 degree rotation is not provided, the jib or boom shall be pointed downwind from the prevailing wind and the slewing brake set.

(q) Each tower crane shall be provided with a braking system on the trolley capable of stopping and holding the trolley in any desired position while carrying a maximum load. This brake shall be capable of being locked in a fixed location without additional attention of the operator. An automatic brake or device shall be installed which will immediately stop and lock the trolley in position in the event of a breakage of the trolley rope.

(r) All electrical equipment shall be properly grounded and protection shall be provided against lightning.

(s) When the operator is actually operating the crane, the operator shall remain in a stationary position.

(t) All crane brakes shall automatically set in event of power failure. Swing brakes shall also function in this manner or be capable of being set manually.

(u) Climbing jack systems used for raising a tower crane shall be equipped with over-pressure relief valves, direct-reading pressure gauges, and pilot-operated hydraulic check valves installed in a manner which will prevent jack from retracting should a hydraulic line or fitting rupture or fail.

(v) During periods of high winds or weather affecting visibility, i.e., fog, etc., only loads shall be handled that are consistent with good safety practices. Good safety practices shall be mutually agreed upon by the operator and the person in charge of the construction job, with due consideration given to manufacturer's specifications and recommendations.

(w) Counterweights shall be securely fastened in place and shall not exceed the weight as recommended by the manufacturer for the length of jib being used. However, an amount of counterweight as recommended by the manufacturer shall be used.

(x) Tower cranes shall be inspected and maintained in accordance with the manufacturer's recommendations or more frequently if there is reason to suspect a possible defect or weakening of any portion of the structure or equipment.

(y) Guy wires, wedges, braces or other supports shall be inspected at the beginning and at midpoint of each working shift to ascertain that they are functioning as intended.

(6) Additional tower crane requirements.

(a) An approved method shall be instituted for transmitting signals to the operator. Standard hand signals for crane operations shall be used, whenever possible; however, if conditions are such that hand signals are ineffective, radio-controlled or electric-whistle signal or two-way voice communication shall be used. (See WAC 296-155-525 (4)(d).)

(b) Tower cranes shall not be erected or raised when the wind velocity at the worksite exceeds 20 m.p.h. or that specified by the manufacturer.

(c) Tower crane operators shall be trained and experienced in tower crane operations; however, for gaining experience, persons may operate the tower crane if under the immediate supervision of an experienced operator.

(d) Adequate clearance shall be maintained between moving and rotating structures of the crane and fixed objects to allow the passage of employees without harm.

(e) Employees required to perform duties on the horizontal boom of hammerhead tower cranes shall be protected against falling by guardrails or by a full body harness and lanyards attached to crane or to lifelines in conformance with Part C-1 of this chapter.

(f) Buffers shall be provided at both ends of travel of the trolley.

(g) Cranes mounted on rail tracks shall be equipped with limit switches limiting the travel of the crane on the track and stops or buffers at each end of the tracks.

(h) All hammerhead tower cranes in use shall meet the applicable requirements for design, construction, installation, testing, maintenance, inspection, and operation as prescribed by the manufacturer.

(i) Access ladders inside the telescoping sections of tower cranes are exempt from those sections of the safety standards pertaining to cleat length and cleat spacing, but shall conform to manufacturer's recommendations and specifications.

(7) Overhead and gantry cranes.

(a) The rated load of the crane shall be plainly marked on each side of the crane, and if the crane has more than one hoisting unit, each hoist shall have its rated load marked on it or its load block, and this marking shall be clearly legible from the ground or floor.

(b) Bridge trucks shall be equipped with sweeps which extend below the top of the rail and project in front of the truck wheels.

(c) Except for floor-operated cranes, a gong or other effective audible warning signal shall be provided for each crane equipped with a power traveling mechanism.

(d) All overhead and gantry cranes in use shall meet the applicable requirements for design, construction, installation, testing, maintenance, inspection, and operation as prescribed in ANSI B30.2.0-1990, Safety Code for Overhead and Gantry Cranes.

(8) Derricks. All derricks in use shall meet the applicable requirements for design, construction, installation, inspection, testing, maintenance, and operation as prescribed in American National Standard Institute B30.6-1990, Safety Code for Derricks.

(9) Floating cranes and derricks.

(a) Mobile cranes mounted on barges.

(i) When a mobile crane is mounted on a barge, the rated load of the crane shall not exceed the original capacity specified by the manufacturer.

(ii) A load rating chart, with clearly legible letters and figures, shall be provided with each crane, and securely fixed at a location easily visible to the operator.

(iii) When load ratings are reduced to stay within the limits for list of the barge with a crane mounted on it, a new load rating chart shall be provided.

- (iv) Mobile cranes on barges shall be positively secured.
- (b) Permanently mounted floating cranes and derricks.
- (i) When cranes and derricks are permanently installed on a barge, the capacity and limitations of use shall be based on competent design criteria.
- (ii) A load rating chart with clearly legible letters and figures shall be provided and securely fixed at a location easily visible to the operator.
- (iii) Floating cranes and floating derricks in use shall meet the applicable requirements for design, construction, installation, testing, maintenance, and operation as prescribed by the manufacturer.
- (c) Protection of employees working on barges. The employer shall comply with the applicable requirements for protection of employees as specified in WAC 296-155-630.
- (10) Mobile cranes and excavation machines.
- (a) In all power driven shovel operations the person in charge shall issue instructions necessary to prevent accidents, to detect and correct unsafe acts and dangerous conditions, and to enforce all safety rules and regulations.
- The person in charge shall also issue instructions on the proper method of using tools and handling material.
- (b) Where the ground is soft or uneven, timbering and planking shall be used to provide firm foundation and distribute the load.
- (c) In case of a breakdown, the shovel shall be moved away from the foot of the slope before repairs are made.
- (d) All persons shall keep away from the range of the shovel's swing and shall not be permitted to stand back of the shovel or in line with the swing of the dipper during operation or moving of shovel.
- (e) Unauthorized persons shall not be allowed on the shovel during operations, and the operator shall not converse with other persons while operating machine.
- (f) The shovel dipper shall rest on the ground or on blocking during shut down periods.
- (g) Shovels shall be inspected daily and all defects promptly repaired.
- (h) All rubber tired mobile cranes shall be equipped with outriggers and sufficient blocking to properly stabilize crane while operating.
- (i) Rubber tired mobile cranes shall be equipped with rear view mirrors.
- (j) Positive boom stops shall be provided on all mobile cranes of the wheel and crawler type.
- (k) Length of a crane boom and amount of counterweight shall not exceed manufacturer's rated capacity for equipment involved; except on isolated cases where permission is granted by the department.
- (l) On all cranes where wedge beackets are used as terminal connections, the proper size wedge shall be used.
- (m) On all mobile cranes, the hoist and boom drums shall be provided with a positive operated pawl or dog which shall be used in addition to the brake to hold the load and boom when they are suspended. Counterweight operated dogs are prohibited.
- (n) Oiling and greasing shall be done under safe conditions with machine at rest, except when motion of machine is necessary.
- (o) All steps, running boards, and boom ladder shall be of substantial construction and in good repair at all times.

(p) Operators shall not leave the cab while master clutch is engaged.

(q) Fire extinguishers shall be readily accessible and within reach of operator at all times.

(r) All shovel and crane cabs shall be kept clean and free of excess oil and grease on floor and machinery. Oily and greasy rags shall be disposed of immediately after use and not allowed to accumulate.

(s) Tools shall not be left on the cab floor. Spare cans of oil or fuel, and spare parts, shall not be stored in cabs, except in approved racks provided for that purpose.

(t) Mats or planking shall be used in moving shovels or cranes over soft or uneven ground.

(u) Cranes or shovels setting on steep grades shall be securely blocked or secured with a tail hold.

(v) Smoking shall be prohibited while fueling or oiling machines.

(w) Gasoline powered motors shall be stopped during refueling.

(x) Handling of movable feed line (bologna) shall be accomplished with insulated hooks and lineman's rubber gloves.

(y) Where cables cross roads they shall be elevated or placed in a trench.

(z) On all power shovels, including back-hoe types, of one-half cubic yard capacity or over, and on all dragline cranes or all-purpose cranes of the crawler or wheel type, two persons shall constitute the minimum working crew. It is mandatory that one be a qualified operator of the equipment in use. The job title of the other crew member may be oiler, rigger, signal person, or a laborer. The primary purpose of the second crew member is to signal the operator when the operator's vision is impaired or obscured and to be on-hand in case of emergency.

(i) Second-crew persons shall be properly trained in their second-person required skills.

(ii) The second crew member shall be close enough to the machine in operation to be aware of any emergency, if one arises, and to assure the machine is operated with necessary and appropriate signals to the operator.

[Statutory Authority: RCW 49.17.040, [49.17].050 and [49.17].060. 95-17-036, § 296-155-525, filed 8/9/95, effective 9/25/95. Statutory Authority: Chapter 49.17 RCW. 91-03-044 (Order 90-18), § 296-155-525, filed 1/10/91, effective 2/12/91; Order 76-29, § 296-155-525, filed 9/30/76; Order 74-26, § 296-155-525, filed 5/7/74, effective 6/6/74.]

WAC 296-155-527 Appendix A to WAC 296-155-525. Due to crane design configuration to maintain mobility, sheave diameters and rope, design factors are limited. Because of these limited design parameters, inspection to detect deterioration in accordance with subsections below and timely replacement are essential.

(1) Frequent inspection.

(a) All running ropes in service should be visually inspected once each working day. A visual inspection shall consist of observation of all rope which can reasonably be expected to be in use during the day's operations. These visual observations should be concerned with discovering gross damage, such as listed below, which may be an immediate hazard:

(i) Distortion of the rope such as kinking, crushing, unstranding, birdcaging, main strand displacement, or core

protrusion. Loss of rope diameter in a short rope length or unevenness of outer strands should provide evidence that the rope or ropes must be replaced.

(ii) General corrosion.

(iii) Broken or cut strands.

(iv) Number, distribution and type of visible broken wires. (See subsection below for further guidance.)

(v) Core failure in rotation resistant ropes. When such damage is discovered the rope shall be either removed from service or given an inspection as detailed in periodic inspection.

(b) Care shall be taken when inspecting sections of rapid deterioration such as flange points, crossover points and repetitive pickup points on drums.

(c) Care shall be taken when inspecting certain ropes such as the following:

(i) Rotation resistant ropes, because of their higher susceptibility to damage and increased deterioration when working on equipment with limited design parameters. The internal deterioration of rotation resistant ropes may not be readily observable.

(ii) Boom hoist ropes, because of the difficulties of inspection and the important nature of these ropes.

(2) Periodic inspection.

(a) The inspection frequency shall be determined by a qualified person and shall be based on such factors as expected rope life as determined by experience on the particular installation or similar installations, severity of environment, percentage of capacity lifts, frequency rates of operation, and exposure to shock loads. Inspections need not be at equal calendar intervals and should be more frequent as the rope approaches the end of its useful life. This inspection shall be performed at least annually.

(b) Periodic inspections shall be performed by a qualified person. This inspection shall cover the entire length of rope. Only the surface wires of the rope need be inspected. No attempt should be made to open the rope. Any deterioration resulting in an appreciable loss of original strength, such as described below, shall be noted and determination made as to whether further use of the rope would constitute a hazard:

(i) Points listed in subsection (1) of this section (Frequent inspection).

(ii) Reduction of rope diameter below nominal diameter due to loss of core support, internal or external corrosion, or wear of outside wires.

(iii) Severely corroded or broken wires at end connections.

(c) Care shall be taken when inspecting sections of rapid deterioration, such as the following:

(i) Sections in contact with saddles, equalizer sheaves, or other sheaves where rope travel is limited;

(ii) Sections of the rope at or near terminal ends where corroded or broken wires may protrude.

(3) Rope replacement.

(a) No precise rules can be given for determination of the exact time for replacement of rope, since many variable factors are involved. Continued use in this respect depends largely upon good judgment by an appointed or authorized person in evaluating remaining strength in a used rope after allowance for deterioration disclosed by inspection. Continued rope operations depends upon this remaining strength.

(b) Conditions such as the following shall be sufficient reason for questioning continued use of the rope or increasing the frequency of inspection:

(i) In running ropes, six randomly distributed broken wires in one lay or three broken wires in one strand in one lay (for special conditions relating to rotation resistant rope refer to paragraph 5-3.2.1.1 (d)(1)(b) ANSISASME B30.5 1989).

(ii) One outer wire broken at the point of contact with the core of the rope which has worked its way out of the rope structure and protrudes or loops out from the rope structure. Additional inspection of this section is required.

(iii) Wear of one-third the original diameter of outside individual wires.

(iv) Kinking, crushing, birdcaging, or any other damage resulting in distortion of the rope structure.

(v) Evidence of any heat damage from any cause.

(vi) Reductions from nominal diameter of more than:

(A) 1/64 in. (0.4 mm) for diameters up to and including 5/16 in. (8.0 mm);

(B) 1/32 in. (0.8 mm) for diameters 3/8 in. (9.5 mm) to and including 1/2 in. (13.0 mm);

(C) 3/64 in. (1.2 mm) for diameters 9/16 in. (14.5 mm) to and including 3/4 in. (19.0 mm);

(D) 1/6 in. (1.6 mm) for diameters 7/8 in. (22.0 mm) to and including 1 1/8 in. (38.0 mm).

(vii) In standing ropes, more than two broken wires in one lay in sections beyond end connections or more than one broken wire at an end connection.

(c) Replacement rope shall have a strength rating at least as great as the original rope furnished or recommended by the crane manufacturer. Any deviation from the original size, grade, or construction shall be specified by a rope manufacturer, the crane manufacturer or a qualified person.

(d) Rope not in regular use. All rope which has been idle for a period of a month or more due to shutdown or storage of a crane on which it is installed shall be given an inspection before it is placed in service. This inspection shall be for all types of deterioration and shall be performed by an appointed or authorized person.

(e) Inspection records:

(i) Frequent inspection; no records required.

(ii) Periodic inspection: In order to establish data as a basis for judging the proper time for replacement, a dated report of rope condition at each periodic inspection shall be kept on file. This report shall cover points of deterioration. If the rope is replaced only that part need be recorded.

(f) A long-range inspection program should be established and should include records on the examination of ropes removed from service so that a relationship can be established between visual observation and actual condition of the internal structure.

(4) Rope maintenance.

(a) Rope should be stored to prevent damage or deterioration.

(b) Unreeling or uncoiling of rope shall be done as recommended by the rope manufacturer and with care to avoid kinking or inducing a twist.

(c) Before cutting a rope, seizings shall be placed on each side of the place where the rope is to be cut to prevent unlaying of the strands. On preformed rope, one seizing on each side of the cut is required. On nonpreformed ropes of

7/8 in. (22 mm) diameter or smaller, two seizings on each side of the cut are required, and for nonpreformed rope of 1 in. (26 mm) diameter or larger, three seizings on each side of the cut are required.

(d) During installation, care should be exercised to avoid dragging of the rope in dirt or around objects which will scrape, nick, crush, or induce sharp bends in it.

(e) Rope should be maintained in a well lubricated condition. It is important that lubricant applied as part of a maintenance program shall be compatible with the original lubricant, and to this end, the rope manufacturer should be consulted; lubricant applied shall be of the type which does not hinder visual inspection. Those sections of rope which are located over sheaves or otherwise hidden during inspection and maintenance procedures require special attention when lubricating rope. The object of rope lubrication is to reduce internal friction and to prevent corrosion.

(f) When an operating rope shows greater wear at well-defined localized areas than on the remainder of the rope, rope life can be extended (in cases where a reduced rope length is adequate) by cutting off a section at the worn end, and thus shifting the wear to different areas of the rope.

(5) Operating near electric power lines:

(a) Cranes shall be operated so that no part of the crane or load enters into the danger zone.

Exceptions: The danger zone may be entered if the electrical distribution and transmission lines have been de-energized and visibly grounded at the point of work; or the danger zone may be entered if insulating barriers (not a part of nor an attachment to the crane) have been erected to prevent physical contact with the lines.

(i) For lines rated 50 kV. or below, minimum clearance between the lines and any part of the crane or load (including handling appendages) shall be 10 feet (3 m).

(ii) Caution shall be exercised when working near overhead lines because they can move horizontally or vertically due to wind, moving the danger zone to new positions.

(iii) While in transit with no load and boom lowered, the clearance shall be as specified in WAC 296-155-525 (3)(e).

(iv) A qualified signal person shall be assigned to observe the clearance when the crane moves to within a boom's length of the limits specified in WAC 296-155-525 (3)(e). The operator is not in the best position to judge distance between the power line and the crane or its protuberances.

(b) If cage-type boom guards, insulating links, or proximity warning devices are used on cranes, such devices shall not be a substitute for the requirements of WAC 296-155-525 (3)(e), even if such devices are required by law or regulation. In view of the complex, invisible, and lethal nature of the electrical hazard involved, and to lessen the potential of false security, limitations of such devices, if used, shall be understood by operating personnel and tested in the manner and intervals prescribed by the manufacturer of the device. Compliance with WAC 296-155-525 (3)(e) is the recommended practice of this regulation in determining permissible proximity of the crane and its protuberances, including load, to electrical power lines.

(c) Before the commencement of operations near electrical lines, the person responsible for the job shall notify

the owners of the lines or their authorized representatives, provide them with all pertinent information, and request their cooperation.

(d) Any overhead wire shall be considered to be an energized line unless and until the person owning such line or the electrical utility authorities verify that it is not an energized line.

(e) Exceptions to this procedure, if approved by the owner of the electrical lines, may be granted by the administrative or regulatory authority if the alternate procedure provides protection and is set forth in writing.

(f) Durable signs shall be installed at the operator's station and on the outside of the crane warning that electrocution or serious bodily injury may occur unless a minimum clearance of 10 feet (3 m) is maintained between the crane or the load being handled and energized power lines. Greater clearances are required because of higher voltage as stated in WAC 296-155-525 (3)(e). These signs shall be revised when local jurisdiction requires greater clearances.

(6) Site preparation and erection.

(a) All load bearing foundations, supports, and rail tracks shall be constructed or installed to support the crane loads and to transmit them to the soil or other support medium. In addition to supporting vertical load, foundations and supports, rail supports excepted, should be designed to provide a moment resisting overturning equal to a minimum of 150% of the maximum crane overturning moment.

(b) Rails should be level and straight, unless specifically designed for curves or grades, and properly spaced for the crane trucks in accordance with the manufacturer's specifications. The track and support system should have sufficient rigidity to limit dynamic oscillations and deviations from plumb.

(c) Rails shall be securely attached to the supporting surface in a manner capable of resisting the horizontal and vertical loads specified by the manufacturer. When applicable, provisions should be made for thermal expansion and contraction.

(d) Splices in rail tracks (bolted or welded) shall have smooth joints.

(e) When required, a designated portion of the track should be arranged and constructed as an out-of-service parking area complete with means needed for supporting the crane against storm wind effects and anchoring it against unwanted movement along the track; the parking track should be in place before erection commences.

(f) Rails shall be electrically grounded when they carry cranes electrically powered from an outside source.

(g) Both ends of all tracks shall be provided with stops or buffers adjusted for simultaneous contact with both sides of the travel base.

(h) When more than one crane will be operating on a run of track, particular consideration should be given to the number and disposition of parking areas.

(i) The hazard of earthquake effects appropriated to the site or zone should be considered.

(j) The crane manufacturer shall provide maximum resulting loads at the base of the crane, or wheel loads, for use in design of the supports.

(7) General erection requirements.

(a) When cranes are erected, the manufacturer's or a qualified person's written erection instructions and a list of

the weights of each component to be erected shall be at the site.

(b) Cranes shall be erected in accordance with the crane manufacturer's or a qualified person's recommendations. Erection shall be performed under the supervision of a qualified person.

(c) Procedures shall be established before erection work commences to implement the erection instructions and to adapt them to the particular needs of the site. The need for temporary guying and bracing during erection shall be established.

(d) Before crane components are erected, they shall be visually inspected for damage. Damaged members shall not be erected until repaired in accordance with the manufacturer's or qualified person's instructions, or replaced.

(e) Slings and lifting accessories shall be selected and arranged to avoid damaging or marring crane members during erection.

(f) Wind velocity at the site at the time of erection should be considered as a limiting factor that could require suspending the erection operation.

(g) Crane towers shall be erected plumb to a tolerance that is specified by the manufacturer.

(h) Cranes required to weathervane when out-of-service shall be installed with clearance for the boom and superstructure to swing a full 360° arc without striking a fixed object or other crane.

[Statutory Authority: RCW 49.17.040, [49.17].050 and [49.17].060. 95-17-036, § 296-155-527, filed 8/9/95, effective 9/25/95.]

WAC 296-155-530 Material hoists, personnel hoists, and elevators. (1) General requirements.

(a) The employer shall comply with the manufacturer's specifications and limitations applicable to the operation of all hoists and elevators. Where the manufacturer's specifications are not available, the limitations assigned to the equipment shall be based on the determinations of a professional engineer competent in the field.

(b) The employer shall ensure that no person shall enter a hoistway, elevator shaft, or similar enclosure in which the hoisting apparatus or vehicle is installed and functioning unless the power source operating those systems is locked out in accordance with WAC 296-155-429.

(c) Rated load capacities, recommended operating speeds, and special hazard warning or instructions shall be posted on cars and platforms.

(d) Wire rope shall be removed from service when any of the following conditions exists:

(i) In hoisting ropes, six randomly distributed broken wires in one rope lay or three broken wires in one strand in one rope lay;

(ii) Abrasion, scrubbing, flattening, or peening, causing loss of more than one-third of the original diameter of the outside wires;

(iii) Evidence of any heat damage resulting from a torch or any damage caused by contact with electrical wires;

(iv) Reduction from nominal diameter of more than three sixty-fourths inch for diameters up to and including three-fourths inch; one-sixteenth inch for diameters seven-eighths to 1 1/8 inches; and three thirty-seconds inch for diameters 1 1/4 to 1 1/2 inches.

(e) Hoisting ropes shall be installed in accordance with the wire rope manufacturer's recommendations.

(f) The installation of live booms on hoists is prohibited.

(g) The use of endless belt-type man lifts on construction shall be prohibited.

(h) Employees shall not be permitted to ride on top of material hoists, personnel hoists or permanent elevators except for purposes of inspection, maintenance, elevator installation or dismantling work.

(2) Material hoists, (a)(i) Operating rules shall be established and posted at the operator's station of the hoist. Such rules shall include signal system and allowable line speed for various loads. Rules and notices shall be posted on the car frame or crosshead in a conspicuous location, including the statement "No riders allowed."

(ii) No person shall be allowed to ride on material hoists except for the purposes of inspection and maintenance.

(b) All entrances of the hoistways shall be protected by substantial gates or bars which shall guard the full width of the landing entrance. All hoistway entrance bars and gates shall be painted with diagonal contrasting colors, such as black and yellow stripes.

(i) Bars shall be not less than 2- by 4-inch wooden bars or the equivalent, located 2 feet from the hoistway line. Bars shall be located not less than 36 inches nor more than 42 inches above the floor.

(ii) Gates or bars protecting the entrances to hoistway shall be equipped with a latching device.

(c) Overhead protective covering of two-inch planking, 3/4-inch plywood or other solid material of equivalent strength shall be provided on the top of every material hoist cage or platform to prevent objects falling on the workers loading or unloading the hoist.

(i) The protective covering on the top of the cage or platform may be made in hinged sections that may be raised when hoisting long material.

(ii) When using a cage or platform for long material, the several pieces of the material shall be securely fastened together and made fast to the cage or platform, so that no part of the load can fall or project beyond the sides of the cage or platform.

(d) The operator's station of a hoisting machine shall be provided with overhead protection equivalent to tight planking not less than 2 inches thick. The support for the overhead protection shall be of equal strength.

(e) Hoist towers may be used with or without an enclosure on all sides. However, whichever alternative is chosen, the following applicable conditions shall be met:

(i) When a hoist tower is enclosed, it shall be enclosed on all sides for its entire height with a screen enclosure of 1/2-inch mesh, No. 18 U.S. gauge wire or equivalent, except for landing access.

(ii) When a hoist tower is not enclosed, the hoist platform or car shall be totally enclosed (caged) on all sides for the full height between the floor and the overhead protective covering with 1/2-inch mesh of No. 14 U.S. gauge wire or equivalent. The hoist platform enclosure shall include the required gates for loading and unloading. A 6-foot high enclosure shall be provided on the unused sides of the hoist tower at ground level.

(f) Car arresting devices shall be installed to function in case of rope failure.

- (g) All material hoist towers shall be designed by a licensed professional engineer.
- (h) All material hoists shall conform to the requirements of ANSI A10.5-1969, Safety Requirements for Material Hoists.
 - (3) Personnel hoists.
 - (a) Personnel hoists shall be provided for access and egress on all multi story buildings where vertical travel exceeds sixty feet from a ground level access point.
 - (b) Hoist towers outside the structure shall be enclosed for the full height on the side or sides used for entrance and exit to the structure. At the lowest landing, the enclosure on the sides not used for exit or entrance to the structure shall be enclosed to a height of at least 10 feet. Other sides of the tower adjacent to floors or scaffold platforms shall be enclosed to a height of 10 feet above the level of such floors or scaffolds.
 - (c) Towers inside of structures shall be enclosed on all four sides throughout the full height.
 - (d) Towers shall be anchored to the structure at intervals not exceeding 25 feet. In addition to tie-ins, a series of guys shall be installed. Where tie-ins are not practical the tower shall be anchored by means of guys made of wire rope at least one-half inch in diameter, securely fastened to anchorages to ensure stability.
 - (e) Hoistway doors or gates shall be not less than 6 feet 6 inches high and shall be provided with mechanical locks which cannot be operated from the landing side, and shall be accessible only to persons on the car.
 - (f) Cars shall be permanently enclosed on all sides and the top, except sides used for entrance and exit, which have car gates or doors.
 - (g) A door or gate shall be provided at each entrance to the car which shall protect the full width and height of the car entrance opening.
 - (h) Overhead protective covering of 2-inch planking, 3/4-inch plywood or other solid material of equivalent strength shall be provided on the top of every personnel hoist.
 - (i) Doors or gates shall be provided with electric contacts which do not allow movement of the hoist when door or gate is open.
 - (j) A signal device shall be installed in the elevator car and only operated by an attendant who shall give the signals for operation, when transporting workers.
 - (k) An electrical push button signalling device or other approved signalling system shall be provided at each floor landing connected to an annunciator in the car. The signal code shall be posted adjacent to the signal device at each and every work level and at operator's work level. All wording shall be black on a white card, in large clear letters.
 - (l) The elevator machine and controls shall be housed in as a protection against accidents and the weather, and the door kept locked against unauthorized entrance when operator is not in attendance.
 - (m) Safeties shall be capable of stopping and holding the car and rated load when traveling at governor tripping speed.
 - (n) Cars shall be provided with a capacity and data plate secured in a conspicuous place on the car or crosshead.
 - (o) Internal combustion engines shall not be permitted for direct drive.

- (p) Normal and final terminal stopping devices shall be provided.
- (q) An emergency stop switch shall be provided in the car and marked "stop."
- (r) Ropes:
 - (i) The minimum number of hoisting ropes used shall be three for traction hoists and two for drum-type hoists.
 - (ii) The minimum diameter of hoisting and counterweight wire ropes shall be 1/2-inch.
 - (iii) Safety factors:

MINIMUM FACTORS OF SAFETY
FOR SUSPENSION WIRE ROPES

Rope speed in feet per minute:	Minimum factor of safety
50	7.60
75	7.75
100	7.95
125	8.10
150	8.25
175	8.40
200	8.60
225	8.75
250	8.90
300	9.20
350	9.50
400	9.75
450	10.00
500	10.25
550	10.45
600	10.70

- (s) Following assembly and erection of hoists, and before being put in service, an inspection and test of all functions and safety devices shall be made under the supervision of a competent person. A similar inspection and test is required following major alteration of an existing installation. All hoists shall be inspected and tested at not more than 3-month intervals. Records shall be maintained and kept on file for the duration of the job.
- (t) All personnel hoists used by employees shall be constructed of materials and components which meet the specifications for materials, construction, safety devices, assembly, and structural integrity as stated in the American National Standard A10.4-1963, Safety Requirements for Workmen's Hoists. The requirements of this subdivision do not apply to cantilever type personnel hoists.
- (u) Wire rope shall be taken out of service when any of the following conditions exist:
 - (i) In running ropes, six randomly distributed broken wires in one lay or three broken wires in one strand in one lay;
 - (ii) Wear of one-third the original diameter of outside individual wires. Kinking, crushing, bird caging, or any other damage resulting in distortion of the rope structure;
 - (iii) Evidence of any heat damage from any cause;
 - (iv) Reductions from nominal diameter of more than three-sixty-fourths inch for diameters to and including three-fourths inch, one sixteenth inch for diameter seven-eighths inch to 1 1/8 inches inclusive, three-thirty-seconds inch for diameters 1 1/4 to 1 1/2 inches inclusive;
 - (v) In standing ropes, more than two broken wires in one lay in sections beyond end connections or more than one broken wire at an end connection.

(v)(i) Personnel hoists used in bridge tower construction shall be approved by a registered professional engineer and erected under the supervision of a qualified engineer competent in this field.

(ii) When a hoist tower is not enclosed, the hoist platform or car shall be totally enclosed (caged) on all sides for the full height between the floor and the overhead protective covering with 3/4-inch mesh of No. 14 U.S. gauge wire or equivalent. The hoist platform enclosure shall include the required gates for loading and unloading.

(iii) These hoists shall be inspected and maintained on a weekly basis. Whenever the hoisting equipment is exposed to winds exceeding 35 miles per hour it shall be inspected and put in operable condition before reuse.

(4) Permanent elevators under the care and custody of the employer and used by employees for work covered by this act shall comply with the requirements of American National Standards Institute, A17.1-1971, and inspected in accordance with A17.2-1960 with addenda A17.2a-1965, A17.2b-1967.

Note: For additional information refer to chapter 296-100 WAC, safety requirements for material hoists.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-530, filed 7/20/94, effective 9/20/94; 91-03-044 (Order 90-18), § 296-155-530, filed 1/10/91, effective 2/12/91. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-530, filed 1/21/86; Order 74-26, § 296-155-530, filed 5/7/74, effective 6/6/74.]

WAC 296-155-535 Base-mounted drum hoists. (1) General requirements.

(a) Exposed moving parts such as gears, projecting screws, setscrews, chain, cables, chain sprockets, and reciprocating or rotating parts, which constitute a hazard, shall be guarded.

(b) All controls used during the normal operation cycle shall be located within easy reach of the operator's station.

(c) Electric motor operated hoists shall be provided with:

(i) A device to disconnect all motors from the line upon power failure and not permit any motor to be restarted until the controller handle is brought to the "off" position;

(ii) Where applicable, an overspeed preventive device;

(iii) A means whereby remotely operated hoists stop when any control is ineffective.

(d) All base-mounted drum hoists in use shall meet the applicable requirements for design, construction, installation, testing, inspection, maintenance, and operation, as prescribed by the manufacturer.

(2) Specific requirements. (Reserved.)

[Order 74-26, § 296-155-535, filed 5/7/74, effective 6/6/74.]

WAC 296-155-540 Overhead hoists. (1) General requirements.

(a) The safe working load of the overhead hoist, as determined by the manufacturer, shall be indicated on the hoist, and this safe working load shall not be exceeded.

(b) The supporting structure to which the hoist is attached shall have a safe working load equal to that of the hoist.

(c) The support shall be arranged so as to provide for free movement of the hoist and shall not restrict the hoist from lining itself up with the load.

(d) The hoist shall be installed only in locations that will permit the operator to stand clear of the load at all times.

(e) Air hoists shall be connected to an air supply of sufficient capacity and pressure to safely operate the hoist. All air hoses supplying air shall be positively connected to prevent their becoming disconnected during use.

(f) All overhead hoists in use shall meet the applicable requirements for construction, design, installation, testing, inspection, maintenance, and operation, as prescribed by the manufacturer.

(2) Specific requirements. (Reserved.)

[Order 74-26, § 296-155-540, filed 5/7/74, effective 6/6/74.]

WAC 296-155-545 Conveyors. (1) All conveyors in use shall meet the applicable requirements for design, construction, inspection, testing, maintenance, and operation, as prescribed in ANSI B20.1-1976, Safety Code for Conveyors, Cableways, and Related Equipment.

(2) Starting precautions.

(a) When the entire length of a conveyor is visible from the starting switch, the operator shall visually check to make certain that all persons are in the clear before starting the conveyor.

(b) When the entire length of the conveyor is not visible from the starting switch, a positive audible or visible warning system shall be installed and operated to warn persons that the conveyor will be started.

(c) All reasonable precautions shall be taken by the operator prior to starting a conveyor, to assure that no person is in a hazardous location where they may be injured when the conveyor is started.

(3) Riding and walking on conveyors.

(a) Riding on conveyor chains, belt, or bucket elevators shall be prohibited.

(b) Persons shall not be allowed to walk on conveyors except for emergency purposes and then only after the conveyor has been de-energized and the person can do so safely.

(c) Riding of conveyors shall only be permitted on the manlift steps and platforms with handholds attached and other safety factors as specified in chapter 296-82 WAC, Safety standards for existing belt manlifts.

(4) Stop controls.

(a) Means for stopping the motor or engine of a conveyor shall be provided at the operator's station.

(b) If the operator's station is at a remote point, similar provisions for stopping the motor or engine shall be provided at the motor or engine location.

(5) Emergency controls. Emergency stop switches shall be arranged so that the conveyor cannot be started again until the actuating stop switch has been reset to running or "on" position.

(6) Screw type conveyors. Screw or auger type conveyors shall be guarded to prevent employee contact with turning flights.

(7) Overhead conveyors.

(a) Where a conveyor passes over work areas, aisles, or thoroughfares, guards shall be provided to protect persons required to work below the conveyors.

(b) Where a conveyor crosses over an aisle or passageway, it shall be conspicuously marked by suitable signs, as required by Part E of this chapter.

(c) When the return strand of a conveyor operates within seven feet of the floor there shall be a trough provided of sufficient strength to carry the weight resulting from a broken chain. If the strands are over a passageway, a means shall be provided to catch and support the ends of the chain in the event of a break.

(8) Emergency stop.

(a) Conveyors shall be provided with an emergency stopping device (panic-type) which can be reached from the conveyor.

(b) The emergency stopping device shall be located near the material entrance and shall stop the conveyor a sufficient distance away from the hazard to prevent injury.

(c) Where the conveyor leading into such equipment is under constant control of an operator who has full view of the material entrance who is located or restrained where they cannot possibly fall onto the conveyor an emergency stopping device is not mandatory.

(9) Conveyor lockout.

(a) Conveyors shall be locked out with a padlock at any time repair, maintenance, or clean-up work is being performed on the conveyor.

(b) Tags or push-button stops are not acceptable.

(10) Where conveyors are in excess of seven feet in height, means shall be provided to safely permit essential inspection and maintenance operations.

(11) Conveyor repair.

(a) Any part showing signs of significant wear shall be inspected carefully and replaced prior to reaching a condition where it may create a hazard.

(b) Replacement parts shall be equal to or exceed the manufacturer's specifications.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-545, filed 7/20/94, effective 9/20/94. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-545, filed 1/21/86; Order 74-26, § 296-155-545, filed 5/7/74, effective 6/6/74.]

WAC 296-155-550 Aerial cableways. (1) Cableways shall be designed to withstand the maximum required load with a safety factor of five (5) on all its parts.

(2) Safety stay lines shall be installed at anchor ends and equal in strength to the cableway.

(3) Where towers are required they shall be securely guyed or constructed to carry the maximum sustained load.

(4) Towers shall be provided with ladderways to facilitate safe access for repairs and inspections.

(5) Towers shall have sufficient elevation to provide substantial clearance for cableway and loads carried over all contemplated work.

(6) Running lines and sheaves, where accessible, shall be guarded.

(7) The carrier, carrier sheaves, bearings, bucket latch and all working parts shall be lubricated and visually inspected daily.

(8) All the wire ropes shall be kept lubricated with proper lubricant.

(9) Daily visual inspection shall be made of the button line, especially at the buttons where abrasion is caused by the carrier rebound. Rubber and steel ferrule shock absorbers shall be placed at each end of buttons.

(10) All loading, unloading and working stations shall be adequately lighted for night operation. Clearance lights shall be installed on all high points under cableway.

[Order 74-26, § 296-155-550, filed 5/7/74, effective 6/6/74.]

WAC 296-155-555 Gin poles. (1) Gin poles shall be properly guyed according to the type used.

(2) Anchors may be of "dead men" or attached to some permanent stable structure.

(3) When the guy lines are anchored to a permanent structure, the anchors shall be distant at least one-half the height of the pole from its base, and when "dead men" are used, they shall be located a distant from the base at least one and one-half times the height of the pole.

(4) The pole shall be securely fastened at the foot to prevent kicking out during operation.

(5) Gin poles shall be of selected timber, sound and free from knots or other injurious defects.

(6) Allowable loads for spruce timbers used as gin poles. The allowable loads and the limiting lengths given are based on the U.S. Forest Products Laboratory Standard Recommendations for Spruce of Common Grade, based on pin connected ends for columns.

Actual	Length in feet	Allowable load capacity in tons
6" x 6"	10	10.4
6" x 6"	15	6.6
6" x 6"	20	3.7
6" x 6"	25 Max.	2.4
8" x 8"	20	11.7
8" x 8"	25	7.5
8" x 8"	30	5.2
8" x 8"	33 4" Max.	4.2
10" x 10"	25	18.2
10" x 10"	30	12.7
10" x 10"	35	9.3
10" x 10"	41 8" Max.	6.6
12" x 12"	30	26.3
12" x 12"	35	19.3
12" x 12"	40	14.8
12" x 12"	45	11.7
12" x 12"	50 Max.	9.5

(7) When gin poles are spliced to increase their length, the splicing shall be made with heavy planking at least four feet long securely bolted to all four (4) sides of the pole. If splicing planks are spiked, they shall be securely lashed at the same points.

(8) Additional guy lines shall be attached at the point of splice.

[Order 74-26, § 296-155-555, filed 5/7/74, effective 6/6/74.]

WAC 296-155-560 Concrete bucket towers. (1) A concrete bucket tower located inside a structure, and which is three feet or less from any scaffold or the edge of the

shaftway or floor opening in which it is installed, shall be enclosed on all sides with heavy wire netting formed of number sixteen U.S. gauge one and one-half inch mesh. Wood slats placed vertically and spaced not more than one and one-half inches apart may be used instead of the netting.

The enclosure shall extend at least eight feet above such scaffold or floor.

(2) A concrete bucket tower located outside a structure shall be enclosed to a height of eight feet at lower landing with heavy wire netting formed of number sixteen U.S. gauge wire one and one-half inch mesh or other suitable material.

(3) Openings with platforms shall be formed at each floor level, and the runway leading to the tower shall be guarded with standard railings and toeboards.

(4) If the bucket is discharged into a chute, the chute shall be substantially constructed of wood or metal and extend from the tower to the point where the concrete is to be poured, or transferred to vehicles or hoppers, and the chute shall be substantially supported.

(5) The pit shall be drained and deep enough so that any spill from the bucket will fall below the blocking on which the bucket rests while being filled.

(6) Persons shall not be allowed to work in the pit without first resting the bucket on strong timbers supported on two sides of the tower.

(7) The bucket tower shall be securely guyed at two or more elevations as may be necessary.

(8) The guide rails shall be carefully aligned and kept in good condition to prevent the bucket being caught or clogged while being hoisted.

(9) The sheaves over which the cable passes shall be firmly secured to overhead sheave beams and supporting frame work and the sheaves shall be kept lubricated.

(10) The hoisting cable shall be frequently inspected and renewed when broken wires or other defects are discovered.

(11) A platform provided with standard railings and toeboards shall be constructed at the point where the concrete is dumped into the chute. A ladder shall be fastened to one side of the tower to enable a person to reach the platform in safety.

(12) Workers shall be prohibited from riding in or on the bucket.

[Order 74-26, § 296-155-560, filed 5/7/74, effective 6/6/74.]

WAC 296-155-565 Hoisting engines. (1) All gearing on hoisting engines shall be enclosed. Steam piping subject to contact shall be insulated and if electrical equipment is used, it shall be grounded.

(2) Hoisting engines shall be of ample capacity and equipped with brakes capable of sustaining one hundred and fifty percent of rated load for stopping and sustaining the maximum load in any position.

(3) Hoisting engines shall be protected against the weather and falling objects by a substantial cover.

(4) All hoisting equipment shall be frequently inspected, and brakes, gears and operating levers kept in working condition.

(5) Guards shall be provided to prevent persons coming in contact with hoisting cables.

(6) Brake drums shall be kept free of oil or grease.

(7) A positive operated pawl shall be used in addition to the brake to hold the load when it is suspended. Counter weight operated dogs are prohibited.

(8) Hoisting engines shall not be set up in the street when it can be avoided; but, if so located, they shall be completely housed.

(9) Only competent personnel shall operate material hoists.

(10) The operator shall not lift a load when a person is on the hoist, and all towers shall be posted to that effect, except as provided in other sections of this part.

(11) The operator shall be notified when any person goes up the tower ladder, or before any work is done on any part of the tower, overhead work, hoist or in the pit.

(12) The operator shall make daily inspections of all equipment before starting operations.

(13) When the hoisting engine is located close to the building operation, it shall be covered with a strong plank roof covering to protect the operator from falling objects.

(14) Exhaust steam pipes shall discharge overhead so as not to obstruct the view of the operator or scald persons.

(15) In the operation of hoists, the operator shall always give a warning sign or signal before starting.

(16) When hoisting machinery is set on an elevated platform such platform shall be of substantial construction and standard guard rails and toeboards shall be provided along all open sides of the platform.

(17) Material hoists of more than one drum capacity shall be equipped with brake controls.

(18) A safety strap shall be provided on the foot block of all hoists.

(19) When electric motors are used for hoisting equipment, they shall be operated only by qualified personnel.

(a) Installations shall be made in accordance with provisions of local and national electrical safety codes, and shall be made by experienced workers only.

(b) Inclosed switches and fuses shall always be used.

(c) Switchboards shall be screened, and a sign placed warning unauthorized persons to keep clear.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-565, filed 7/20/94, effective 9/20/94; Order 74-26, § 296-155-565, filed 5/7/74, effective 6/6/74]

WAC 296-155-570 Rigging—Wire rope. (1)

Whenever used in connection with work, employment, occupations or uses to which these standards are applicable, wire rope shall not be subjected to loads in excess of one-fifth the breaking load as given in the schedule of the cable manufacturer.

(2) Any wire rope showing 10% of its wires broken in a three foot length shall not be used. When cables deteriorate through rusting, wear, undue strain or other conditions to the extent of 15% of their original strength, use of cable shall be discontinued.

(3) Wire rope shall be frequently inspected for wear and other defects which may reduce the strength below the point of safe operation.

(4) If wire rope is received in a coil it shall be rolled out, on a surface free from grit, like a hoop and straightened out before being put on the sheaves. If it is received on a

reel, the reel shall be mounted on a spindle or turntable and the rope then unwound.

(5) Wire rope shall be lubricated. A lubricant recommended by a wire rope manufacturer shall be used.

(6) Wire rope shall be securely fastened to drums by zinc plugs or suitable clamps, and at least two full turns of the rope shall remain on the winding drum.

(7) Wire rope shall be wound evenly on the drum and not allowed to lap one layer on another in an irregular fashion.

(8) Care shall be taken to prevent friction of wire ropes with other objects which could cause chafing or breaking of wires.

(9) In attaching U-type cable clamps, the U shall always be placed over the short end of the cable.

(10) The clamp nuts shall be tightened up frequently during the operation to prevent slipping.

(11) Thimbles shall be used in cable eyes whenever practicable.

(12) Fair leads shall be used ahead of cable drums, whenever practicable, and the fleet angle kept as flat as possible to promote proper spooling.

(13) All running lines of hoisting equipment, located within seven (7) feet of the ground or working level shall be boxed, railed off or otherwise guarded, or the operating area restricted.

(14) Wire rope which has been welded or been subject to welding of any kind shall not be used.

(15) No open hook shall be used to hoist a bucket, cage, spreader, or skip, nor in any circumstances where the dislodgement of the hook could cause a risk of injury to workers. A safety-hook, mousing, or shackle shall be employed in such circumstances.

(16) When shackles are used, shackle pins shall be secured to prevent accidental withdrawal.

(17) Where a wedge socket connector is used as a wire rope terminal, a single wire rope clip shall be installed in accordance with WAC 296-155-330 (3)(g).

(18) The wire rope shall not be burned off with heat. This may weld the ends of the wires and strands together.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-570, filed 1/21/86; Order 74-26, § 296-155-570, filed 5/7/74, effective 6/6/74.]

WAC 296-155-575 Helicopters and helicopter cranes. (1) Helicopter regulations. Helicopter cranes shall be expected to comply with any applicable regulations of the Federal Aviation Administration.

(2) Briefing. Prior to each day's operation a briefing shall be conducted. This briefing shall set forth the plan of operation for the pilot and ground personnel.

(3) Slings and tag lines. Load shall be properly slung. Tag lines shall be of a length that will not permit their being drawn up into rotors. Pressed sleeve, swedged eyes, or equivalent means shall be used for all freely suspended loads to prevent hand splices from spinning open or cable clamps from loosening.

(4) Cargo hooks. All electrically operated cargo hooks shall have the electrical activating device so designed and installed as to prevent inadvertent operation. In addition, these cargo hooks shall be equipped with an emergency

mechanical control for releasing the load. The hooks shall be tested prior to each day's operation to determine that the release functions properly, both electrically and mechanically.

(5) Personal protective equipment.

(a) Personal protective equipment for employees receiving the load shall consist of complete eye protection and hard hats secured by chinstraps.

(b) Loose-fitting clothing likely to flap in the downwash, and thus be snagged on hoist line, shall not be worn.

(6) Loose gear and objects. Every practical precaution shall be taken to provide for the protection of the employees from flying objects in the rotor downwash. All loose gear within 100 feet of the place of lifting the load, depositing the load, and all other areas susceptible to rotor downwash shall be secured or removed.

(7) Housekeeping. Good housekeeping shall be maintained in all helicopter loading and unloading areas.

(8) Operator responsibility. The helicopter operator shall be responsible for size, weight, and manner in which loads are connected to the helicopter. If, for any reason, the helicopter operator believes the lift cannot be made safely, the lift shall not be made.

(9) Hooking and unhooking loads. Employees shall not perform work under hovering craft except for that limited period of time necessary to guide, secure and unhook loads, or to hook loads. Regardless of whether the hooking or unhooking of a load takes place on the ground or a flat roof, or other location in an elevated work position in structural members, a safe means of access and egress, to include an unprogrammed emergency escape route or routes, shall be provided for the employees who are hooking or unhooking loads.

(10) Static charge. Static charge on the suspended load shall be dissipated with a grounding device before ground personnel touch the suspended load, or protective rubber gloves shall be worn by all ground personnel touching the suspended load.

(11) Weight limitation. The weight of an external load shall not exceed the manufacturer's rating.

(12) Ground lines. Hoist wires or other gear, except for pulling lines or conductors that are allowed to "pay out" from a container or roll off a reel, shall not be attached to any fixed ground structure, or allowed to foul on any fixed structure.

(13) Visibility. When visibility is reduced by dust or other conditions, ground personnel shall exercise special caution to keep clear of main and stabilizing rotors. Precautions shall also be taken by the employer to eliminate as far as practical reduced visibility.

(14) Signal systems. Signal systems between aircrew and ground personnel shall be understood and checked in advance of hoisting the load. This applies to either radio or hand signal systems. Hand signals shall be as shown in Figure L-1.

(15) Approach distance. No unauthorized person shall be allowed to approach within 50 feet of the helicopter when the rotor blades are turning.

(16) Approaching helicopter. Whenever approaching or leaving a helicopter with blades rotating, all employees shall remain in full view of the pilot and keep in a crouched position. Employees shall avoid the area from the cockpit

or cabin rearward unless authorized by the helicopter operator to work there.

(17) Personnel. Sufficient ground personnel shall be provided when required for safe helicopter loading and unloading operations.

(18) Communications. There shall be constant reliable communication between the pilot, and a designated employee of the ground crew who acts as a signalperson during the period of loading and unloading. This signalperson shall be distinctly recognizable from other ground personnel.

(19) Fires. Open fires shall not be permitted in an area that could result in such fires being spread by the rotor downwash.

(20) Refueling operations.

(a) Under no circumstances shall the refueling of any type helicopter with either aviation gasoline or Jet B (turbine-kerosene) type fuel be permitted while the engines are running.

(b) No unauthorized persons shall be allowed within fifty feet of the refueling operation or fueling equipment.

(c) A minimum of one thirty-pound fire extinguisher, or a combination of same, good for Class A, B and C fires, shall be provided within one hundred feet on the upwind side of the refueling operation.

(d) All fueling personnel shall be thoroughly trained in the refueling operation and in the use of available fire extinguishing equipment.

(e) There shall be no smoking, open flames, exposed flame heaters, flare pots or open flame lights for spark producing agents within fifty feet of the refueling area or fueling equipment. All entrances to the refueling area shall be posted with "NO SMOKING" signs.

(f) Due to the numerous causes of static electricity, it should be considered present at all times. Prior to starting refueling operations, the fueling equipment and the helicopter shall be grounded and the fueling nozzle shall be electrically bonded to the helicopter.

(i) Conductive hose shall not be used to accomplish the bonding.

(ii) All grounding and bonding connections shall be electrically and mechanically firm, to clean unpainted metal parts.

(g) To control spills:

(i) Fuel shall be pumped either by hand or power.

(ii) Pouring or gravity flow shall not be permitted.

(iii) Selfclosing nozzles shall not be dragged on the ground.

(h) In case of a spill, the fueling operation shall be immediately stopped until such time as the person in charge determines that it is safe to resume the refueling operation.

(i) When ambient temperatures have been in the one hundred degree F range for an extended period of time, all refueling of helicopters with the engines running shall be suspended until such time as conditions become suitable to resume refueling with the engines running.

(21) Hook on persons shall wear contrasting colored hard hats, with chinstraps, and high visibility vests or outer garments to enable the helicopter operator to readily identify their locations.

(22) Riding the load or hook of a helicopter is prohibited except in the case of emergency and then only with the proper safety gear.

(1997 Ed.)

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-575, filed 7/20/94, effective 9/20/94. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-575, filed 1/21/86; Order 76-28, § 296-155-575, filed 9/28/76; Order 74-26, § 296-155-575, filed 5/7/74, effective 6/6/74.]

WAC 296-155-576 Figure L-1.

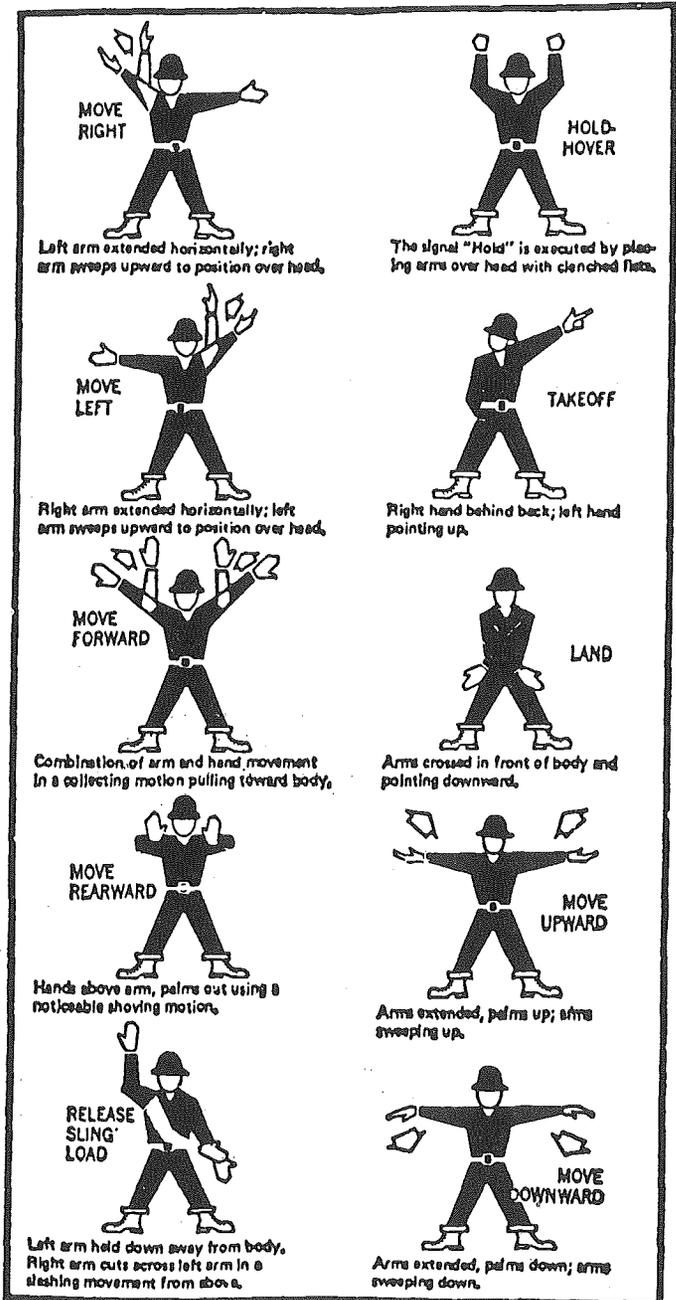


Figure L-1

HELICOPTER HAND SIGNALS

[Order 74-26, Figure L-1 (codified as WAC 296-155-576), filed 5/7/74, effective 6/6/74. Formerly WAC 296-155-575 (part).]

WAC 296-155-59901 Table 1.

TABLE 1

STANDARD 6 x 7 WIRE ROPE¹

Diameter	Approximate Weight Per Foot	Breaking Strength in Tons of 2,000 Pounds		
		Improved Plow Steel	Plow Steel	Mild Plow Steel
Inches	Pounds			
1/4	0.094	2.64	2.30	3.10
5/16	.15	4.10	3.56	3.10
3/8	.21	5.86	5.10	4.43
7/16	.29	7.93	6.90	6.00
1/2	.38	10.3	8.96	7.79
9/16	.48	13.0	11.3	9.82
5/8	.59	15.9	13.9	12.0
3/4	.84	22.7	19.8	17.2
7/8	1.15	30.7	26.7	23.2
1	1.50	39.7	34.5	30.0
1- 1/8	1.90	49.8	43.3	37.7
1- 1/4	2.34	61.0	53.0	46.1
1- 3/8	2.84	73.1	63.6	55.3
1- 1/2	3.38	86.2	75.0	65.2

¹For these ropes with steel centers, add 7 1/2% to the above strengths. For these ropes when galvanized, deduct 10% from the above strengths.

[Order 74-26, § 296-155-580 (part), Table 1 (codified as WAC 296-155-59901), filed 5/7/74, effective 6/6/74.]

WAC 296-155-59902 Table 2.

TABLE 2

STANDARD 6 x 19 WIRE ROPE¹

Diameter	Approximate Weight Per Foot	Breaking Strength in Tons of 2,000 Pounds		
		Improved Plow Steel	Plow Steel	Mild Plow Steel
Inches	Pounds			
1/4	0.10	2.74	2.39	2.07
5/16	.16	4.26	3.71	3.22
3/8	.23	6.10	5.31	4.62
7/16	.31	8.27	7.19	6.25
1/2	.40	10.7	9.35	8.13
9/16	.51	13.5	11.8	10.2
5/8	.63	16.7	14.5	12.6
3/4	.90	23.8	20.7	18.0
7/8	1.23	32.2	28.0	24.3
1	1.60	41.8	36.4	31.6
1- 1/8	2.03	52.6	45.7	39.8
1- 1/4	2.50	64.6	56.2	48.8
1- 3/8	3.03	77.7	67.5	58.8
1- 1/2	3.60	92.0	80.0	69.6
1- 5/8	4.23	107.0	93.4	81.2
1- 3/4	4.90	124.0	108.0	93.6
1- 7/8	5.63	141.0	123.0	107.0
2	6.40	160.0	139.0	121.0
2- 1/8	7.23	179.0	156.0	...
2- 1/4	8.10	200.0	174.0	...
2- 1/2	10.0	244.0	212.0	...
2- 3/4	12.10	292.0	254.0	...

¹For these ropes with steel centers, add 7 1/2% to the above strengths. For these ropes when galvanized, deduct 10% from the above strengths.

[Order 74-26, § 296-155-580 (part), Table 2 (codified as WAC 296-155-59902), filed 5/7/74, effective 6/6/74.]

WAC 296-155-59903 Table 3.

TABLE 3

STANDARD 8 x 19 WIRE ROPE¹

Diameter	Approximate Weight Per Foot	Breaking Strength in Tons of 2,000 Pounds	
		Improved Plow Steel	Plow Steel
Inches	Pounds		
1/4	0.09	2.35	2.04
5/16	.14	3.65	3.18
3/8	.20	5.24	4.55
7/16	.28	7.09	6.17
1/2	.36	9.23	8.02
9/16	.46	11.6	10.1
5/8	.57	14.3	12.4
3/4	.82	20.5	17.8
7/8	1.11	27.7	24.1
1	1.45	36.0	31.3
1- 1/8	1.84	45.3	39.4
1- 1/4	2.27	55.7	48.4
1- 3/8	2.74	67.1	58.3
1- 1/2	3.26	79.4	69.1

¹For these ropes with steel centers, add 7 1/2% to the above strengths. For these ropes when galvanized, deduct 10% from the above strengths.

[Order 74-26, § 296-155-580 (part), Table 3 (codified as WAC 296-155-59903), filed 5/7/74, effective 6/6/74.]

WAC 296-155-59904 Table 4.

TABLE 4

STANDARD 6 x 37 WIRE ROPE¹

Diameter	Approximate Weight Per Foot	Breaking Strength in Tons of 2,000 Pounds	
		Improved Plow Steel	Plow Steel
Inches	Pounds		
1/4	0.10	2.59	2.25
5/16	.16	4.03	3.50
3/8	.22	5.77	5.02
7/16	.30	7.82	6.80
1/2	.39	10.2	8.85
9/16	.49	12.9	11.2
5/8	.61	15.8	13.7
3/4	.87	22.6	19.6
7/8	1.19	30.6	26.6
1	1.55	39.8	34.6
1- 1/8	1.96	50.1	43.5
1- 1/4	2.42	61.5	53.5
1- 3/8	2.93	74.1	64.5
1- 1/2	3.49	87.9	76.4
1- 5/8	4.09	103.0	89.3
1- 3/4	4.75	119.0	103.0
1- 7/8	5.45	136.0	118.0
2	6.20	154.0	134.0
2- 1/8	7.00	173.0	150.0

2- 1/4	7.85	193.0	168.0
2- 1/2	9.69	236.0	205.0
2- 3/4	11.72	284.0	247.0
3	13.95	335.0	291.0
3- 1/4	16.37	390.0	339.0
3- 1/2	19.40	449.0	390.0

For these ropes with steel centers, add 7 1/2% to the above strengths.
For these ropes when galvanized, deduct 10% from the above strengths.

[Statutory Authority: Chapter 49.17 RCW. 91-24-017 (Order 91-07), § 296-155-59904, filed 11/22/91, effective 12/24/91; Order 74-26, § 296-155-580 (part), Table 4 (codified as WAC 296-155-59904), filed 5/7/74, effective 6/6/74.]

WAC 296-155-59905 Table 5.

TABLE 5

STANDARD 6 x 19 ELEVATOR ROPE

DIAMETER	Approximate Weight Per Foot	BREAKING STRENGTH		
		Iron	Traction Steel	High-Rise Traction Steel
Inches				
3/16	0.06	1,300	...	...
1/4	.10	2,200	3,600	...
5/16	.16	3,200	5,600	...
3/8	.23	5,000	8,200	...
7/16	.31	6,400	11,000	...
1/2	.40	8,400	14,500	...
9/16	.51	10,600	18,500	...
5/8	.63	12,800	23,000	...
11/16	.76	...	27,000	30,000
3/4	.90	18,200	32,000	...
13/16	1.06	...	37,000	46,000
7/8	1.23	24,800	42,000	...
15/16	1.41	...	48,000	60,000
1	1.60	32,000	54,000	...
1- 1/16	1.81	...	61,000	...

[Order 74-26, § 296-155-580 (part), Table 5 (codified as WAC 296-155-59905), filed 5/7/74, effective 6/6/74.]

WAC 296-155-59906 Table 6.

TABLE 6

STANDARD 8 x 19 ELEVATOR ROPE

DIAMETER	Approximate Weight Per Foot	BREAKING STRENGTH		
		Iron	Traction Steel	High-Rise Traction Steel
Inches				
3/16	0.05	1,000	...	...
1/4	.09	1,800	3,600	...
5/16	.14	2,900	5,600	...
3/8	.20	4,200	8,200	...
7/16	.28	5,600	11,000	...
1/2	.36	7,200	14,500	...
9/16	.46	9,200	18,500	...

(1997 Ed.)

5/8	.57	11,200	23,000	...
11/16	.69	...	27,000	30,000
3/4	.82	16,000	32,000	...
13/16	.96	...	37,000	46,000
7/8	1.11	21,400	42,000	...
15/16	1.27	...	48,000	60,000
1	1.45	28,000	54,000	...
1- 1/16	1.64	...	61,000	...

[Order 74-26, § 296-155-580 (part), Table 6 (codified as WAC 296-155-59906), filed 5/7/74, effective 6/6/74.]

WAC 296-155-59907 Table 7.

TABLE 7

STANDARD 5 x 19 MARLINE CLAD ROPE¹

DIAMETER	Approximate Weight Per Foot	Breaking Strength in Tons of 2,000 Pounds		
		Before Serving	After Serving	Plow Steel
Inches				
1/4	9/16	0.21	2.17	1.89
5/16	5/8	.28	3.37	2.93
3/8	11/16	.36	4.82	4.20
7/16	3/4	.42	6.53	5.68
1/2	13/16	.51	8.50	7.39
9/16	7/8	.62	10.7	9.31
5/8	1	.81	13.2	11.4
3/4	1-1/8	1.10	18.8	16.4
7/8	1-1/4	1.70	25.5	22.1
1	1-3/8	1.32	33.7	28.7
1- 1/8	1-1/2	2.12	41.6	36.2
1- 1/4	1-5/8	2.58	51.1	44.4
1- 3/8	1-3/4	3.14	61.4	53.4
1- 1/2	1-7/8	3.69	...	...
1- 5/8	2	4.29	...	...
1- 3/4	2-1/8	5.00	...	...

¹For these ropes with steel centers, add 7 1/2% to the above strengths.
For these ropes when galvanized, deduct 10% from the above strengths.

[Order 74-26, § 296-155-580 (part), Table 7 (codified as WAC 296-155-59907), filed 5/7/74, effective 6/6/74.]

WAC 296-155-59908 Table 8.

TABLE 8

STANDARD 18 x 7 NONROTATING ROPE

DIAMETER	Approximate Weight Per Foot	Breaking Strength in Tons of 2,000 Pounds	
		Improved Plow Steel	Plow Steel
Inches	Pounds		
3/8	0.24	5.59	4.86
7/16	.33	7.58	6.59
1/2	.43	9.85	8.57
9/16	.55	12.4	10.8
5/8	.68	15.3	13.3
3/4	.97	21.8	19.0
7/8	1.32	29.5	25.7
1	1.73	38.3	33.3
1-1/8	2.19	48.2	41.9
1-1/4	2.70	59.2	51.5

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1-3/8	3.27	71.3	62.0
1-1/2	3.89	84.4	73.4
1-5/8	4.57	98.4	85.6
1-3/4	5.30	114.0	98.8

[Order 74-26, § 296-155-580 (part), Table 8 (codified as WAC 296-155-59908), filed 5/7/74, effective 6/6/74.]

WAC 296-155-59909 Table 9.

TABLE 9

STANDARD 6 x 12 GALVANIZED RUNNING ROPE AND HAWSERS

DIAMETER	Approximate Weight Per Foot	Breaking Strength in Tons of 2,000 Pounds		
		Galvanized Improved Plow Steel	Galvanized Plow Steel	Galvanized Iron
Inches	Pounds			
5/16	0.10	2.34	2.04	0.905
3/8	.15	3.36	2.92	1.30
7/16	.20	4.55	3.95	1.76
1/2	.26	5.91	5.14	2.28
9/16	.33	7.45	6.48	2.88
5/8	.41	9.16	7.97	3.54
3/4	.59	13.1	11.4	5.06
13/16	.69	15.3	13.3	5.92
7/8	.80	17.7	15.4	6.85
1	1.05	23.0	20.0	8.89
1- 1/16	1.19	25.9	22.5	10.0
1- 1/8	1.33	29.0	25.2	...
1- 3/16	1.48	32.2	28.0	...
1- 1/4	1.64	35.6	30.9	...
1- 3/8	1.99	42.8	37.2	...
1- 7/16	2.17	46.7	40.6	...
1- 1/2	2.36	50.7	44.1	...
1- 5/8	2.77	59.2	51.4	...
1- 11/16	2.99	63.6	55.3	...
1- 3/4	3.22	68.3	59.4	...
1- 15/16	3.45	78.0	63.5	...
1- 15/16	3.94	83.0	72.2	...
2	4.20	88.2	76.7	...
2- 1/16	4.47	93.6	81.4	...

[Order 74-26, § 296-155-580 (part), Table 9 (codified as WAC 296-155-59909), filed 5/7/74, effective 6/6/74.]

WAC 296-155-59910 Table 10.

TABLE 10

STANDARD 6 x 25 GALVANIZED STEEL MOORING LINES AND HAWSERS

DIAMETER	Approximate Weight Per Foot	Breaking Strength in Tons of 2,000 Pounds	
		Galvanized Improved Plow Steel	Galvanized Plow Steel
Inches	Pounds		
3/8	0.194	4.77	4.14
1/2	.35	8.40	7.30
5/8	.54	13.0	11.3
3/4	.78	18.6	16.2
13/16	.91	21.8	19.0
7/8	1.06	25.2	21.9

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1	1.38	32.8	28.5
1- 1/16	1.56	36.9	32.1
1- 1/8	1.75	41.2	35.9
1- 3/16	1.95	45.9	39.9
1- 1/4	2.16	50.7	44.1
1- 3/8	2.61	61.0	53.0
1- 7/16	2.85	66.5	57.9
1- 1/2	3.11	72.3	62.9
1- 5/8	3.64	84.5	73.4
1- 11/16	3.93	90.9	79.0
1- 3/4	4.23	97.5	84.8
1- 13/16	4.53	104.0	90.8
1- 15/16	5.18	119.0	103.0
2	5.52	126.0	110.0
2- 1/16	5.87	134.0	116.0

[Order 74-26, § 296-155-580 (part), Table 10 (codified as WAC 296-155-59910), filed 5/7/74, effective 6/6/74.]

WAC 296-155-59911 Table 11.

TABLE 11

STANDARD 6 x 37 GALVANIZED STEEL HAWSERS

DIAMETER	Approximate Weight Per Foot	Breaking Strength in Tons of 2,000 Pounds	
		Improved Plow Steel	Plow Steel
Inches	Pounds		
3/4	0.87	21.0	18.2
13/16	1.02	24.5	21.3
7/8	1.19	28.4	24.7
1	1.55	36.9	32.1
1- 1/16	1.75	41.6	36.1
1- 1/8	1.96	46.5	40.4
1- 3/16	2.19	51.7	44.9
1- 1/4	2.42	57.1	49.7
1- 3/8	22.93	68.8	59.8
1- 7/16	3.20	75.0	65.3
1- 1/2	3.49	81.5	70.9
1- 5/8	4.09	95.3	82.9
1- 11/16	4.41	103.0	89.2
1- 3/4	4.75	110.0	95.7
1- 13/16	5.09	118.0	102.0
1- 15/16	5.82	134.0	117.0
2	6.20	143.0	124.0
2- 1/16	6.59	151.0	132.0
2- 1/8	7.00	160.0	139.0
2- 1/4	7.85	179.0	156.0
2- 5/16	8.29	189.0	164.0
2- 3/8	8.74	199.0	173.0

[Order 74-26, § 296-155-580 (part), Table 11 (codified as WAC 296-155-59911), filed 5/7/74, effective 6/6/74.]

WAC 296-155-59912 Table 12.

TABLE 12

STANDARD 6 x 25 TYPE "B" FLATTENED STRAND WIRE ROPE¹

DIAMETER	Approximate Weight Per Foot	Breaking Strength in Tons of 2,000 Pounds	
		Improved Plow Steel	Plow Steel
Inches	Pounds		
3/8	0.25	6.71	...
1/2	.45	11.8	8.94

(1997 Ed.)

9/16	.57	14.9	11.2
5/8	.70	18.3	13.9
3/4	1.01	26.2	19.8
7/8	1.39	35.4	26.8
1	1.80	46.0	34.8
1- 1/8	2.28	57.9	43.8
1- 1/4	2.81	71.0	53.7
1- 3/8	3.40	85.5	...
1- 1/2	4.05	101.0	...
1- 5/8	4.75	118.0	...
1- 3/4	5.51	136.0	...
2	7.20	176.0	...
2- 1/4	9.10	220.0	...
2- 1/2	11.20	269.0	...
2- 3/4	13.60	321.0	...

¹For these ropes when galvanized, deduct 10 percent from the above strengths.

[Order 74-26, § 296-155-580 (part), Table 12 (codified as WAC 296-155-59912), filed 5/7/74, effective 6/6/74.]

WAC 296-155-59913 Table 13.

TABLE 13

STANDARD 6 x 30 TYPE "G"
FLATTENED STRAND WIRE ROPE¹

DIAMETER	Approximate		Breaking Strength in Tons of 2,000 Pounds	
	Inches	Pounds		
5/8	0.70	18.3	13.9	
3/4	1.01	26.2	19.8	
7/8	1.39	35.4	26.8	
1	1.80	46.0	34.8	
1- 1/8	2.28	57.9	43.8	
1- 1/4	2.81	71.0	53.7	
1- 3/8	3.40	85.5	...	
1- 1/2	4.05	101.0	...	
1- 5/8	4.75	118.0	...	
1- 3/4	5.51	136.0	...	
2	7.20	176.0	...	
2- 1/4	9.10	220.0	...	
2- 1/2	11.20	269.0	...	
2- 3/4	13.60	321.0	...	

¹For these ropes with steel centers, add 7 1/2% to above strengths.

[Order 74-26, § 296-155-580 (part), Table 13 (codified as WAC 296-155-59913), filed 5/7/74, effective 6/6/74.]

WAC 296-155-59914 Table 14.

TABLE 14

STANDARD 6 x 8 TYPE "D"
FLATTENED STRAND WIRE ROPE

DIAMETER	Approximate		Breaking Strength in Tons of 2,000 Pounds	
	Weight Per Foot		Improved Plow Steel	Plow Steel
1/2	0.45	11.1	8.37	
5/8	.70	17.1	12.9	
3/4	1.01	24.4	18.5	
7/8	1.39	33.0	24.9	
1	1.80	42.7	32.3	
1- 1/8	2.28	53.5	40.5	
1- 1/4	2.81	65.5	49.5	

(1997 Ed.)

1- 3/8	3.40	78.6	59.4
1- 1/2	4.05	92.7	70.1

[Order 74-26, § 296-155-580 (part), Table 14 (codified as WAC 296-155-59914), filed 5/7/74, effective 6/6/74.]

WAC 296-155-59915 Table 15.

TABLE 15

STANDARD 6 x 6 x 7 TILLER ROPE¹

DIAMETER	Approximate Weight Per Foot	Breaking Strength in Tons of 2,000 Pounds	
		Plow Steel	Iron
1/4	0.07	1.31	0.584
5/16	.11	2.05	.908
3/8	.16	2.93	1.30
7/16	.21	3.98	1.77
1/2	.28	5.18	2.30
9/16	.35	6.53	2.90
5/8	.43	8.04	3.57

¹For these ropes with steel centers, add 7 1/2% to above strengths.

[Order 74-26, § 296-155-580 (part), Table 15 (codified as WAC 296-155-59915), filed 5/7/74, effective 6/6/74.]

WAC 296-155-59916 Table 16.

TABLE 16

STANDARD 9 x 4 GALVANIZED MAST ARM ROPE

Diameter Inches	Approximate Weight Per Foot Pounds	Breaking Strength In Pounds
1/4	0.070	1,100
5/16	.107	1,530
3/8	.158	2,200

[Order 74-26, § 296-155-580 (part), Table 16 (codified as WAC 296-155-59916), filed 5/7/74, effective 6/6/74.]

WAC 296-155-59917 Table 17.

TABLE 17

STANDARD FLAT ROPE

Width and Thickness	Number of Ropes	Approximate Weight Per Foot	Breaking Strength in Tons of 2,000 Pounds	
			Plow Steel	Mild Plow Steel
1/4 x 1-1/2	7	0.69	16.8	14.6
1/4 x 2	9	.88	21.7	18.8
1/4 x 2-1/2	11	1.15	26.5	23.0
1/4 x 3	13	1.34	31.3	27.2
5/16 x 1-1/2	5	.77	18.5	16.0
5/16 x 2	7	1.05	25.8	22.4
5/16 x 2-1/2	9	1.33	33.2	28.8
5/16 x 3	11	1.61	40.5	35.3
5/16 x 3-1/2	13	1.89	47.9	41.7
5/16 x 4	15	2.17	55.3	48.1

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3/8 x 2	6	1.25	31.4	27.3
3/8 x 2-1/2	8	1.64	41.8	36.4
3/8 x 3	9	1.84	47.1	40.9
3/8 x 3-1/2	11	2.23	57.5	50.0
3/8 x 4	12	2.44	62.7	54.6
3/8 x 4-1/2	14	2.83	73.2	63.7
3/8 x 5	15	3.03	78.4	68.2
3/8 x 5-1/2	17	3.42	88.9	77.3
3/8 x 6	18	3.63	94.1	81.9
1/2 x 2-1/2	6	2.13	54.5	47.4
1/2 x 3	7	2.47	63.6	55.4
1/2 x 3-1/2	8	2.82	72.7	63.3
1/2 x 4	9	3.16	81.8	71.2
1/2 x 4-1/2	10	3.82	90.9	79.1
1/2 x 5	12	4.16	109.0	94.9
1/2 x 5-1/2	13	4.50	118.0	103.0
1/2 x 6	14	4.85	127.0	111.0
1/2 x 7	16	5.85	145.0	126.0
5/8 x 3-1/2	6	3.40	85.8	74.6
5/8 x 4	7	3.95	100.0	87.1
5/8 x 4-1/2	8	4.50	114.0	99.5
5/8 x 5	9	5.04	129.0	112.0
5/8 x 5-1/2	10	5.59	143.0	124.0
5/8 x 6	11	6.14	157.0	137.0
5/8 x 7	13	7.23	186.0	162.0
5/8 x 8	15	8.32	214.0	186.0
3/4 x 5	8	6.50	165.0	143.0
3/4 x 6	9	7.31	185.0	161.0
3/4 x 7	10	8.13	206.0	179.0
3/4 x 8	11	9.70	227.0	197.0
7/8 x 5	7	7.50	190.0	165.0
7/8 x 6	8	8.56	217.0	188.0
7/8 x 7	9	9.63	244.0	212.0
7/8 x 8	10	10.69	271.0	236.0

[Order 74-26, § 296-155-580 (part), Table 17 (codified as WAC 296-155-59917), filed 5/7/74, effective 6/6/74.]

WAC 296-155-59918 Table 18.

TABLE 18

STANDARD 6 x 12 MARLINE CLAD
GRAIN-SHOVEL ROPE

Before Serving Inches	After Serving Inches	Approximate Weight Per Foot Pounds	Breaking Strength Tons of 2,000 Pounds
3/4	5/8	0.25	2.50
7/8	3/4	.43	5.50

[Order 74-26, § 296-155-580 (part), Table 18 (codified as WAC 296-155-59918), filed 5/7/74, effective 6/6/74.]

WAC 296-155-59919 Table 19.

TABLE 19

STANDARD 6 x 7 IRON, BRIGHT, AND
GALVANIZED SASH CORDS

DIAMETER	BREAKING STRENGTH			
	Approximate Weight Per Foot	Hard Drawn		Annealed (iron)
		Bright	Galvanized	Bright or Galvanized
Inches	Pounds	Pounds	Pounds	Pounds
1/16	0.006	140	126	77
3/32	.103	315	283	172

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1/8	.023	560	504	306
5/32	.038	840	756	478
3/16	.053	1,150	1,035	688
7/32	.072	1,570	1,413	940
1/4	.094	2,040	1,836	1,225

[Order 74-26, § 296-155-580 (part), Table 19 (codified as WAC 296-155-59919), filed 5/7/74, effective 6/6/74.]

WAC 296-155-59920 Table 20.

TABLE 20

STANDARD 6 x 7 GALVANIZED
IRON RIGGING AND GUY ROPE

Diameter Inches	Approximate Weight Per Foot Pounds	Breaking Strength in Tons of 2,000 Pounds
6 Strands:		
1/4	0.94	0.918
5/16	.15	1.42
3/8	.21	2.04
7/16	.29	2.76
1/2	.38	3.58
9/16	.48	4.51
5/8	.59	5.54
3/4	.84	7.90
13/16	.99	9.23
7/8	1.15	10.7
1	1.50	13.8
1 1/16	1.70	15.5
1 1/8	1.90	17.3
1 3/16	2.12	19.2
1 1/4	2.34	21.2

[Order 74-26, § 296-155-580 (part), Table 20 (codified as WAC 296-155-59920), filed 5/7/74, effective 6/6/74.]

**PART M
MOTOR VEHICLES, MECHANIZED EQUIPMENT,
AND MARINE OPERATIONS**

WAC 296-155-600 Definitions applicable to this part. (1) "Apron" means the area along the waterfront edge of the pier or wharf.

(2) "Bearing cap" means:

(a) A slab of reinforced concrete or a heavy timber and plank platform covering the top of a group of piles for the purpose of tying them together and transmitting to them as a group the superimposed load.

(b) A metal plate placed across the top of a steel tube pile to distribute the load from the steel tube to the concrete.

(3) "Bearing pile" means a column of wood, metal or concrete or a combination of two or more of these materials, driven, jacked, or sunk with a water jet, into the earth to transmit and distribute loads to strata below the surface.

(4) "Bulwark" means the side of a ship above the upper deck.

(5) "Caisson pile" means a concrete pile case in an outer casing consisting of a series of telescoping steel tubes, the top section being the largest and usually twenty inches or more in diameter.

(6) "Coaming" means the raised frame, as around a hatchway in the deck, to keep out water.

(7) "Composite pile" means a pile which consists of a concrete pile superimposed on a wood pile.

(8) "Jacob's ladder" means a marine ladder of rope or chain with wooden or metal rungs.

(9)(a) A "pedestal type" concrete pile means a cast-in-place pile with an enlarged (mushroom) base or foot.

(b) A "tapered type" concrete pile means a cast-in-place pile cast in a tapered metal shell.

(10) "Precast concrete pile" means a pile which is cast in a form above ground.

(11) "Driving cap" means a device placed on the top of a pile to prevent its breakage or injury during the driving operation.

(12) "H-pile" means a pile formed of a structural steel column of "H" section.

(13) "Pile driver" means a device or piece of equipment used in driving piles.

(14) "Pretest or jack pile" means a steel cylinder pile driven in section beneath an existing building and filled with concrete.

(15) "Rail," for the purpose of WAC 296-155-630, means a light structure serving as a guard at the outer edge of a ship's deck.

(16) "Sheet piling" means a continuous vertical barricade consisting of squared timbers driven edge to edge, either square edged or tongued and grooved, or of a series of inter-locking steel shapes, to form a temporary wall about an excavation, and shored and braced as necessary.

(17) "Steel-tube" means a concrete-filled steel cylinder, consisting of an open or closed-end steel tube or cylinder.

(18) "Wood pile" means a pile which is formed from the trunk of a tree or dimension timbers.

[Order 74-26, § 296-155-600, filed 5/7/74, effective 6/6/74.]

WAC 296-155-605 Equipment. (1) General requirements.

(a) All equipment left unattended at night, adjacent to a highway in normal use, or adjacent to construction areas where work is in progress, shall have appropriate lights or reflectors, or barricades equipped with appropriate lights or reflectors, to identify the location of the equipment.

(b) All tire servicing of multi-piece and single-piece rim wheels are subject to the requirements of WAC 296-155-61701 through 296-155-61713.

(c)(i) Heavy machinery, equipment, or parts thereof, which are suspended or held aloft by use of slings, hoists, or jacks shall be substantially blocked or cribbed to prevent falling or shifting before employees are permitted to work under or between them. Bulldozer and scraper blades, end-loader buckets, dump bodies, and similar equipment, shall be either fully lowered or blocked when being repaired or when not in use. All controls shall be in a neutral position, with the motors stopped and brakes set, unless work being performed required otherwise.

(ii) Whenever the equipment is parked, the parking brake shall be set. Equipment parked on inclines shall have the wheels chocked and the parking brake set.

(d) The use, care and charging of all batteries shall conform to the requirements of part I of this chapter.

(e) All cab glass shall be safety glass, or equivalent, that introduces no visible distortion affecting the safe operation of any machine covered by this part.

(f) All equipment covered by this part shall comply with the requirements of WAC 296-155-525 (2)(e) when working or being moved in the vicinity of power lines or energized transmitters.

(g) Where traffic is diverted onto dusty surfaces, good visibility shall be maintained by the suppression of dust, through the periodic application of oil or water to the grade surface, as required.

(h) No equipment, vehicle, tool, or individual shall operate within 10 feet of any power line or electrical distribution equipment except in conformity with the requirements of WAC 296-155-525 (2)(e).

(2) Specific requirements. (Reserved.)

[Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-605, filed 1/21/86; Order 74-26, § 296-155-605, filed 5/7/74, effective 6/6/74.]

WAC 296-155-610 Motor vehicles. (1) Coverage. Motor vehicles as covered by this part include any vehicles that operate on a construction site. The requirements of this section do not apply to equipment for which rules are prescribed in WAC 296-155-615.

(2) General requirements.

(a) All vehicles shall have a service brake system, an emergency brake system, and a parking brake system. These systems may use common components, and shall be maintained in operable condition.

(b) Before leaving a motor vehicle unattended:

(i) The motor shall be stopped.

(ii) Parking brake engaged and wheels turned into curb or berm when parked on an incline.

(iii) When parking on an incline and there is no curb or berm, the wheels shall be chocked or otherwise secured.

(c)(i) Whenever visibility conditions warrant additional light, all vehicles, or combinations of vehicles, in use shall be equipped with at least two headlights and two taillights in operable condition.

(ii) All vehicles, or combination of vehicles, shall have brake lights in operable condition regardless of light conditions.

(d) All vehicles shall be equipped with an adequate audible warning device at the operator's station and in an operable condition.

(e) No employer shall allow the use of any motor vehicle equipment having an obstructed view to the rear unless:

(i) Vehicles other than passenger cars and pickups shall have an automatic reverse signal alarm audible above the surrounding noise level no less than fifteen feet from the rear of the vehicle or:

(ii) The vehicle is backed up only when an observer signals that it is safe to do so.

(f) All vehicles with cabs shall be equipped with windshields, powered wipers, and rear view mirrors. Cracked and broken glass shall be replaced. Vehicles operating in areas or under conditions that cause fogging or frosting of the windshields shall be equipped with operable defogging or defrosting devices.

(g) All haulage vehicles, whose pay load is loaded by means of cranes, power shovels, loaders, or similar equipment, shall have a cab shield and/or canopy adequate to protect the operator from shifting or falling materials.

(h) Tools and material shall be secured to prevent movement when transported in the same compartment with employees.

(i) Vehicles used to transport employees shall have seats firmly secured and adequate for the number of employees to be carried.

(j) Seat belts and anchorages meeting the requirements of 49 CFR Part 571 (Department of Transportation, Federal Motor Vehicle Safety Standards) shall be installed in all motor vehicles.

(k) Trucks with dump bodies or raiseable platforms, beds, or boxes shall be equipped with positive means of support, permanently attached, and capable of being locked in position to prevent accidental lowering of the body while maintenance or inspection work is being done.

(l) Operating levers, controlling hoisting or dumping devices on haulage bodies, shall be equipped with a latch or other device which will prevent accidental starting or tripping of the mechanism.

(m) Trip handles for tailgates of dump trucks shall be so arranged that, in dumping, the operator will be in the clear.

(n) All rubber-tired motor vehicle equipment manufactured on or after May 1, 1972, shall be equipped with fenders. All rubber-tired motor vehicle equipment manufactured before May 1, 1972, shall be equipped with fenders not later than October 1, 1974. Mud flaps may be used in lieu of fenders whenever motor vehicle equipment is not designed for fenders.

(o) All vehicles in use shall be checked at the beginning of each shift to assure that the following parts, equipment, and accessories are in safe operating condition and free of apparent damage that could cause failure while in use: Service brakes, including trailer brake connections; parking system (hand brake); emergency stopping system (brakes); tires; horn; steering mechanism; coupling devices; seat belts; operating controls; and safety devices. All defects shall be corrected before the vehicle is placed in service. These requirements also apply to equipment such as lights, reflectors, windshield wipers, defrosters, fire extinguishers, steps and handholds for vehicle access, etc., where such equipment is necessary.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-610, filed 1/21/86; Order 74-26, § 296-155-610, filed 5/7/74, effective 6/6/74.]

WAC 296-155-615 Material handling equipment.

(1) Earthmoving equipment; general.

(a) These rules apply to the following types of earthmoving equipment: Scrapers, loaders, crawler or wheel tractors, bulldozers, off-highway trucks, graders, agricultural and industrial tractors, and similar equipment. The promulgation of specific rules for compactors and rubber-tired "skid-steer" equipment is reserved pending consideration of standards currently being developed.

(b) Seat belts.

(i) Seat belts shall be provided on all equipment covered by this section and shall meet the requirements of the

Society of Automotive Engineers, J386-1969, Seat Belts for Construction Equipment. Seat belts for agricultural and light industrial tractors shall meet the seat belt requirements of Society of Automotive Engineers J333a-1970, Operator Protection for Agricultural and Light Industrial Tractors.

(ii) Seat belts need not be provided for equipment which is designed only for standup operation.

(iii) Seat belts shall not be provided for equipment which does not have rollover protective structure (ROPS) or adequate canopy protection.

(c) Access roadways and grades.

(i) No employer shall move or cause to be moved construction equipment or vehicles upon any access roadway or grade unless the access roadway or grade is constructed and maintained to accommodate safely the movement of the equipment and vehicles involved.

(ii) Every emergency access ramp and berm used by an employer shall be constructed to restrain and control runaway vehicles.

(d) Brakes. All earthmoving equipment mentioned in WAC 296-155-615 (1)(a) shall have a service braking system capable of stopping and holding the equipment fully loaded, as specified in Society of Automotive Engineers SAE-J237, Loader Dozer-1971, J236, Graders-1971, and J319b, Scrapers-1971. Brake systems for self-propelled rubber-tired off-highway equipment manufactured after January 1, 1972 shall meet the applicable minimum performance criteria set forth in the following Society of Automotive Engineers Recommended Practices:

Self-propelled scrapers	_____	SAE J319b-1971
Self-propelled graders	_____	SAE J236-1971
Trucks and wagons	_____	SAE J166-1971
Front end loaders and dozer	_____	SAE J237-1971

(e) Fenders. Pneumatic-tired earthmoving haulage equipment (trucks, scrapers, tractors, and trailing units) whose maximum speed exceeds 15 miles per hour, shall be equipped with fenders on all wheels to meet the requirements of Society of Automotive Engineers SAE J321a-1970, Fenders for Pneumatic-Tired Earthmoving Haulage Equipment. An employer may, of course, at any time seek to show under WAC 296-155-010, that the uncovered wheels present no hazard to personnel from flying materials.

(f) Rollover protective structures (ROPS). See Part V of this chapter for requirements for rollover protective structures and overhead protection.

(g) Rollover protective structures for off-highway trucks. The promulgation of standards for rollover protective structures for off-highway trucks is reserved pending further study and development.

(h) Specific effective dates—Brakes and fenders. Equipment mentioned in WAC 296-155-615 (d) and (e) and manufactured after January 1, 1972, which is used by any employer after that date, shall comply with the applicable rules prescribed therein concerning brakes. Equipment mentioned in WAC 296-155-615 (d) and (e) and manufactured before January 1, 1972, which is used by any employer after that date, shall meet the applicable rules prescribed herein not later than October 1, 1974. It should be noted

that employers may request variations from the applicable brakes standards required by this part. Employers wishing to seek variations from the applicable brakes rules may submit any requests for variations in accordance with WAC 296-155-010. Any statements should specify how the variation would protect the safety of the employees by providing for any compensating restrictions on the operation of equipment.

(i) Audible alarms.

(i) All bidirectional machines, such as rollers, compactors, front-end loaders, bulldozers, and similar equipment, shall be equipped with a horn, distinguishable from the surrounding noise level, which shall be operated as needed when the machine is moving in either direction. The horn shall be maintained in an operative condition.

(ii) No employer shall permit earthmoving or compacting equipment which has an obstructed view to the rear to be used in reverse gear unless the equipment has in operation a reverse signal alarm distinguishable from the surrounding noise level or an employee signals that it is safe to do so.

(iii) In circumstances where the surrounding noise level is of such amplitude that reverse signal alarms are not effective, amber strobe lights shall be used.

(iv) Operators of equipment which does not have an obstructed view to the rear shall look to the rear while operating the equipment in reverse.

(j) Scissor points. Scissor points on all front-end loaders, which constitute a hazard to the operator during normal operation, shall be guarded.

(k) Tractor motors shall be cranked only by operators or other experienced persons.

(l) Waterproof and comfortable seat cushions shall be provided on tractors at all times when working.

(m) Riders, except mechanics and persons in training to operate equipment, shall not be allowed on equipment unless a seat with a seatbelt is provided and used.

(n) Winch lines shall be maintained in good condition and provided with spliced eye, knob or hook in working end, except under conditions where unspliced end is required.

(o) No repairs on blade or dozer equipment shall be initiated unless motor has been stopped and dozer blade is resting on the ground or securely blocked. The same shall apply to carry-all gates.

(p) Bulldozer blades and carryall gates shall rest on the ground or on blocking when machines are not in operation.

(q) Operator shall not leave controls of tractor with master clutch engaged.

(r) Personnel shall not get on or off machine while machine is in motion.

(s) Where excessive dust conditions are created, such areas shall be sprinkled with water to maintain dust at a minimum.

(t) Respirators shall be worn by operators when subject to harmful dust exposure.

(2) Excavating and other equipment.

(a) Tractors covered in subsection (1) of this section shall have seat belts as required for the operators when seated in the normal seating arrangement for tractor operation, even though backhoes, breakers, or other similar attachments are used on these machines for excavating or other work.

(b) For the purposes of this part and of Part L of this chapter, the nomenclatures and descriptions for measurement of dimensions of machinery and attachments shall be as described in Society of Automotive Engineers 1970 Handbook, pages 1088 through 1103.

(c) The safety requirements, ratios, or limitations applicable to machines or attachment usage covered in Power Crane and Shovel Association's Standards No. 1 and No. 2 of 1968, and No. 3 of 1969, shall be complied with, and shall apply to cranes, machines, and attachments under this part.

(3) Lifting and hauling equipment (other than equipment covered under Part L of this chapter). Industrial trucks shall meet the requirements of WAC 296-155-605 and the following:

(a) Lift trucks, stackers, etc., shall have the rated capacity clearly posted on the vehicle so as to be clearly visible to the operator. When auxiliary removable counterweights are provided by the manufacturer, corresponding alternate rated capacities also shall be clearly shown on the vehicle. These ratings shall not be exceeded.

(b) No modifications or additions which affect the capacity or safe operation of the equipment shall be made without the manufacturer's or professional engineer's written approval. If such modifications or changes are made, the capacity, operation, and maintenance instruction plates, tags, or decals, shall be changed accordingly. In no case shall the original safety factor of the equipment be reduced.

(c) If a load is lifted by two or more trucks working in unison, the proportion of the total load carried by any one truck shall not exceed its capacity.

(d) Steering or spinner knobs shall not be attached to the steering wheel unless the steering mechanism is of a type that prevents road reactions from causing the steering handwheel to spin. The steering knob shall be mounted within the periphery of the wheel.

(e) All high lift rider industrial trucks shall be equipped with overhead guards which meet the configuration and structural requirements as defined in paragraph 502 of American National Standards Institute B56.1-1975, Safety Standards for Powered Industrial Trucks.

(f) All industrial trucks in use shall meet the applicable requirements of design, construction, stability, inspection, testing, maintenance, and operation, as defined in American National Standards Institute B56.1-1975, Safety Standards for Powered Industrial Trucks.

(g) Unauthorized personnel shall not be permitted to ride on powered industrial trucks. A safe place to ride shall be provided where riding of trucks is authorized.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-615, filed 7/20/94, effective 9/20/94. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-615, filed 1/21/86; Order 74-26, § 296-155-615, filed 5/7/74, effective 6/6/74.]

WAC 296-155-617 Servicing multipiece and single-piece rim wheels.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-617, filed 1/21/86.]

WAC 296-155-61701 Scope. (1) Application. This section applies to the servicing of multipiece and single-

piece rim wheels used on large vehicles such as trucks, tractors, trailers, buses and off-road machines. It does not apply to the servicing of rim wheels used on automobiles, or on pickup trucks and vans utilizing automobile tires or truck tires designated "LT."

(2) All provisions of this section apply to the servicing of both single-piece rim wheels and multipiece rim wheels unless designated otherwise.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-61701, filed 1/21/86.]

WAC 296-155-61703 Definitions. (1) "Barrier" means a fence, wall or other structure or object placed between a single-piece rim wheel and an employee during tire inflation, to contain the rim wheel components in the event of the sudden release of the contained air of the single-piece rim wheel.

(2) "Charts" means the United States Department of Transportation, National Highway Traffic Safety Administration (NHTSA) publications entitled *Safety Precautions for Mounting and Demounting Tube-Type Truck/Bus Tires and Multipiece Rim Wheel Matching Chart*, or any other publications such as rim manuals containing, at a minimum, the same instructions, safety precautions and other information contained on those charts that are applicable to the types of rim wheels being serviced.

(3) "Installing a rim wheel" means the transfer and attachment of an assembled rim wheel onto a vehicle axle hub. "Removing" means the opposite of installing.

(4) "Mounting a tire" means the assembly or putting together of the wheel and tire components to form a rim wheel, including inflation. "Demounting" means the opposite of mounting.

(5) "Multipiece rim wheel" means the assemblage of a multipiece wheel with the tire tube and other components.

(6) "Multipiece wheel" means a vehicle wheel consisting of two or more parts, one of which is a side or locking ring designed to hold the tire on the wheel by interlocking components when the tire is inflated.

(7) "Restraining device" means an apparatus such as a cage, rack, assemblage of bars and other components that will constrain all rim wheel components during an explosive separation of a multipiece rim wheel, or during the sudden release of the contained air of a single-piece rim wheel.

(8) "Rim manual" means a publication containing instructions from the manufacturer or other qualified organization for correct mounting, demounting, maintenance, and safety precautions peculiar to the type of wheel being serviced.

(9) "Rim wheel" means an assemblage of tire, tube and liner (where appropriate), and wheel components.

(10) "Service" or "servicing" means the mounting and demounting of rim wheels, and related activities such as inflating, deflating, installing, removing, and handling.

(11) "Service area" means that part of an employer's premises used for the servicing of rim wheels, or any other place where an employee services rim wheels.

(12) "Single-piece rim wheel" means the assemblage of single-piece rim wheel with the tire and other components.

(13) "Single-piece wheel" means a vehicle wheel consisting of one part, designed to hold the tire on the wheel when the tire is inflated.

(14) "Trajectory" means any potential path or route that a rim wheel component may travel during an explosive separation, or the sudden release of the pressurized air, or an area at which an airblast from a single-piece rim wheel may be released. The trajectory may deviate from paths which are perpendicular to the assembled position of the rim wheel at the time of separation or explosion. (See Appendix A for examples of trajectories.)

(15) "Wheel" means that portion of a rim wheel which provides the method of attachment of the assembly to the axle of a vehicle and also provides the means to contain the inflated portion of the assembly (i.e., the tire and/or tube).

[Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-61703, filed 1/21/86.]

WAC 296-155-61705 Employee training. (1) Employer responsibility. The employer shall provide a program to train all employees who service rim wheels in the hazards involved in servicing those multipiece rim wheels and the safety procedures to be followed.

(a) The employer shall assure that no employee services any rim wheel unless the employee has been trained and instructed in correct procedures of servicing the type of wheel being serviced, and in the safe operating procedures described in WAC 296-24-21711.

(b) Information to be used in the training program shall include, at a minimum, the applicable data contained in the charts (rim manuals) and the contents of this standard.

(c) Where an employer knows or has reason to believe that any of the employees are unable to read and understand the charts or rim manual, the employer shall assure that the employee is instructed concerning the contents of the charts and rim manual in a manner which the employee is able to understand.

(2) Employee qualification. The employer shall assure that each employee demonstrates and maintains the ability to service rim wheels safely, including performance of the following tasks:

(a) Demounting of tires (including deflation);

(b) Inspection and identification of the rim wheel components;

(c) Mounting of tires (including inflation with a restraining device or other safeguard required by this section);

(d) Use of the restraining device or barrier, and other equipment required by this section;

(e) Handling of rim wheels;

(f) Inflation of the tire when a single-piece rim wheel is mounted on a vehicle;

(g) An understanding of the necessity of standing outside the trajectory both during inflation of the tire and during inspection of the rim wheel following inflation; and

(h) Installation and removal of wheels.

(3) Ongoing training. The employer shall evaluate each employee's ability to perform these tasks and to service rim wheels safely and shall provide additional training as necessary to assure that each employee maintains his or her proficiency.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-61705, filed 7/20/94, effective 9/20/94. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-61705, filed 1/21/86.]

WAC 296-155-61707 Tire servicing equipment. (1) Restraining device - Multipiece. The employer shall furnish a restraining device for inflating tires on multipiece wheels.

(2) Restraining device - Single-piece. The employer shall provide a restraining device or barrier for inflating tires on single-piece wheels unless the rim wheel will be bolted onto a vehicle during inflation.

(3) Restraining device requirements. Restraining devices and barriers shall comply with the following requirements:

(a) Each restraining device or barrier shall have the capacity to withstand the maximum force that would be transferred to it during a rim wheel separation occurring at one hundred fifty percent of maximum tire specification pressure for the type of rim wheel being serviced;

(b) Restraining devices and barriers shall be capable of preventing rim components from being thrown outside or beyond the device or barrier for any rim wheel position within or behind the device;

(c) Restraining devices and barriers shall be visually inspected prior to each day's use and after any separation of the rim wheel components or sudden release of contained air. Any restraining device or barrier exhibiting damage such as the following defects shall be immediately removed from service:

- (i) Cracks at welds;
 - (ii) Cracked or broken components;
 - (iii) Bent or sprung components caused by mishandling, abuse, tire explosion or rim wheel separation;
 - (iv) Pitting of components due to excessive corrosion;
- or
- (v) Other structural damage which would decrease its effectiveness.

(d) Restraining devices removed from service shall not be returned to service until they are repaired and reinspected. Restraining devices or barriers requiring structural repair such as component replacement or rewelding shall not be returned to service until they are certified either by the manufacturer or by a registered professional engineer as meeting the strength requirements of subsection (3)(a) of this section.

(4) Air line assembly. The employer shall furnish and assure that an air line assembly consisting of the following components be used for inflating tires:

- (a) A clip-on chuck;
- (b) An in-line valve with a pressure gauge or a presettable regulator; and
- (c) A sufficient length of hose between the clip-on chuck and the in-line valve (if one is used) to allow the employee to stand outside the trajectory.

(5) Rim manuals. Current charts (rim manuals) containing instructions for the types of wheels being serviced shall be available in the service area.

(6) Rim manual availability. A current rim manual containing instructions for the type of rims being serviced shall be available in the service area.

(7) Recommended servicing tools. The employer shall furnish and assure that only tools recommended in the rim manual for the type of wheel being serviced are used to service rim wheels.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-61707, filed 1/21/86.]

WAC 296-155-61709 Wheel component acceptability. (1) Interchange of components. Multipiece wheel components shall not be interchanged except as provided in the charts, or in the applicable rim manual.

(2) Inspection of components. Multipiece wheel components and single-piece wheels shall be inspected prior to assembly. Any wheel or wheel component which is bent out of shape, pitted from corrosion, broken or cracked shall not be used and shall be marked or tagged unserviceable and removed from the service area. Damaged or leaky valves shall be replaced.

(3) Condition of components. Rim flanges, rim gutters, rings, bead seating surfaces and the bead areas of tires shall be free of any dirt, surface rust, scale or loose or flaked rubber build-up prior to mounting and inflation.

(4) Compatibility check. The size (bead diameter and tire/wheel widths) and type of both the tire and the wheel shall be checked for compatibility prior to assembly of the rim wheel.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-61709, filed 1/21/86.]

WAC 296-155-61711 Safe operating procedure—Multipiece rim wheels. The employer shall establish a safe operating procedure for servicing multipiece rim wheels and shall assure that employees are instructed in and follow that procedure. The procedure shall include at least the following elements:

(1) Deflation before demounting. Tires shall be completely deflated before demounting by removal of the valve core.

(2) Deflation on axle. Tires shall be completely deflated by removing the valve core, before a rim wheel is removed from the axle in either of the following situations:

- (a) When the tire has been driven underinflated at eighty percent or less of its recommended pressure; or
- (b) When there is obvious or suspected damage to the tire or wheel components.

(3) Rubber lubricant. Rubber lubricant shall be applied to bead and rim mating surfaces during assembly of the wheel and inflation of the tire, unless the tire or wheel manufacturer recommends against it.

(4) Inflation of tire while on vehicle. If a tire on a vehicle is underinflated but has more than eighty percent of the recommended pressure, the tire may be inflated while the rim wheel is on the vehicle provided remote control inflation equipment is used, and no employees remain in the trajectory during inflation.

(5) Tire bead. Tires shall be inflated outside a restraining device only to a pressure sufficient to force the tire bead onto the rim ledge and create an airtight seal with the tire and bead.

(6) Restraining device clearance. Whenever a rim wheel is in a restraining device the employee shall not rest or lean

any part of the body or equipment on or against the restraining device.

(7) Inspection of components. After tire inflation, the tire and wheel components shall be inspected while still within the restraining device to make sure that they are properly seated and locked. If further adjustment to the tire or wheel components is necessary, the tire shall be deflated by removal of the valve core before the adjustment is made.

(8) Use of force. No attempt shall be made to correct the seating of side and lock rings by hammering, striking or forcing the components while the tire is pressurized.

(9) Damaged components. Cracked, broken, bent, or otherwise damaged rim components shall not be reworked, welded, brazed, or otherwise heated.

(10) Trajectory clearance. Whenever multipiece rim wheels are being handled, employees shall stay out of the trajectory unless the employer can demonstrate that performance of the servicing makes the employee's presence in the trajectory necessary.

(11) Wheel heating prohibition. No heat shall be applied to a multi-piece wheel or wheel component.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-61711, filed 7/20/94, effective 9/20/94. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-61711, filed 1/21/86.]

WAC 296-155-61713 Safe operating procedure—Single-piece rim wheels. The employer shall establish a safe operating procedure for servicing single-piece rim wheels and shall assure that employees are instructed in and follow that procedure. The procedure shall include at least the following elements:

(1) Deflation. Tires shall be completely deflated by removal of the valve core before demounting.

(2) Mounting and demounting. Mounting and demounting of the tire shall be done only from the narrow ledge side of the wheel. Care shall be taken to avoid damaging the tire beads while mounting tires on wheels. Tires shall be mounted only on compatible wheels of matching bead diameter and width.

(3) Lubricant. Nonflammable rubber lubricant shall be applied to bead and wheel mating surfaces before assembly of the rim wheel, unless the tire or wheel manufacturer recommends against the use of any rubber lubricant.

(4) Changing machine. If a tire changing machine is used, the tire shall be inflated only to the minimum pressure necessary to force the tire bead onto the rim ledge while on the tire changing machine.

(5) Bead expander. If a bead expander is used, it shall be removed before the valve core is installed and as soon as the rim wheel becomes airtight (the tire bead slips onto the bead seat).

(6) Inflation restrictions. Tires may be inflated only when contained within a restraining device, positioned behind a barrier or bolted on the vehicle with the lug nuts fully tightened.

(7) Inflation trajectory. Tires shall not be inflated when any flat, solid surface is in the trajectory and within one foot of the sidewall.

(8) Employee safety. Employees shall stay out of the trajectory when inflating a tire.

(9) Inflation pressure. Tires shall not be inflated to more than the inflation pressure stamped in the sidewall unless a higher pressure is recommended by the manufacturer.

(10) Seating tire bead. Tires shall not be inflated above the maximum pressure recommended by the manufacturer to seat the tire bead firmly against the rim flange.

(11) Prohibition on use of heat. No heat shall be applied to a single-piece wheel.

(12) Mixing tire and rim sizes. Employee shall be informed of the hazard created by mixing 16" and 16.5" tires and rims.

(13) Defective components. Cracked, broken, bent, or otherwise damaged wheels shall not be reworked, welded, brazed, or otherwise heated.

APPENDIX A
TRAJECTORY

WARNING

STAY OUT OF
THE TRAJECTORY AS
INDICATED BY SHADED AREA

Note: Under some circumstances, the trajectory may deviate from its expected path.

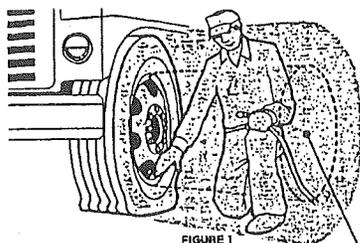


FIGURE 1



FIGURE 2

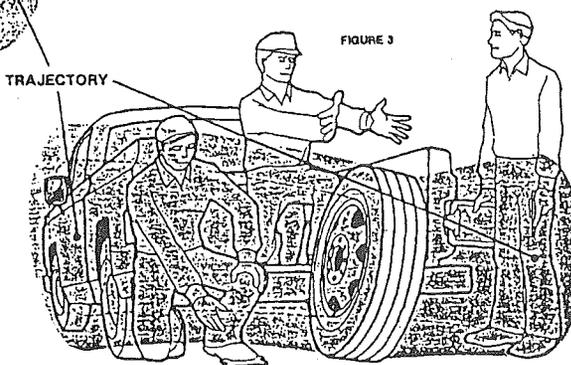


FIGURE 3

APPENDIX A
TRAJECTORY
WARNING
STAY OUT OF
THE TRAJECTORY AS
INDICATED BY SHADED AREA

Note: Under some circumstances,
the trajectory may deviate
from its expected path

Appendix B—Ordering Information for NHTSA charts

The NHTSA charts as part of a continuing campaign to alert rim wheel serving personnel of the industry accepted procedures for servicing multipiece rim wheels.

Prints of the charts are available through the Occupational Safety and Health Administration (OSHA) area offices. The address and telephone number of the nearest OSHA area office can be obtained by looking in the local telephone directory under U.S. Government, U.S. Department of Labor, Occupational Safety and Health Administration.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-61713, filed 7/20/94, effective 9/20/94. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-61713, filed 1/21/86.]

WAC 296-155-620 Pile driving equipment. (1) General requirements.

(a) Boilers and piping systems which are a part of, or used with, pile driving equipment shall meet the applicable requirements of the American Society of Mechanical Engineers, Powers Boilers (section I).

(b) All pressure vessels which are a part of or used with, pile driving equipment shall meet the applicable requirements of the American Society of Mechanical Engineers, Pressure Vessels (section VIII).

(c) Overhead protection, which will not obscure the vision of the operator, and which meets the requirements of Part L of this chapter, shall be provided. Protection shall be of 2-inch planking or other solid material of equivalent strength.

(d) Stop blocks shall be provided for the leads to prevent the hammer from being raised against the head block.

(e) A blocking device, capable of safely supporting the weight of the hammer shall be provided for placement in the leads under the hammer at all times while employees are working under the hammer.

(f) Guards shall be provided across the top of the head block to prevent the cable from jumping out of the sheaves.

(g) When the leads must be inclined in the driving of batter piles, provisions shall be made to stabilize the leads.

(h) All working equipment shall be visually inspected at the beginning of each shift.

(i) Fixed leads shall be provided with ladder, and adequate rings, or similar attachment points, so that the loft workers may engage their full body harness lanyard to the leads. If the leads are provided with loft platform(s) such platform(s) shall be protected by standard guardrails.

(j) Pile drivers with swinging leads shall have a wire rope safety strap on top end.

(k) Spud bars shall be of hard wood with smooth round handle end for safe handling. Iron shod spud bars are prohibited.

(l) A follower block or driving cap shall be used with a drop hammer on all piling except sheet piling.

(m) Steam hose leading to a steam hammer or jet pipe shall be securely attached to the hammer with an adequate length of at least 1/4-inch diameter chain or cable to prevent whipping in the event the joint at the hammer is broken. Air hammer hoses shall be provided with the same protection as required for steam lines.

(n) Safety chains, or equivalent means, shall be provided for each hose connection to prevent the line from thrashing around in case the coupling becomes disconnected.

(o) Steam line controls shall consist of two shutoff valves, one of which shall be a quick-acting lever type within easy reach of the hammer operator.

(p) Guys, outriggers, thrustouts, or counterbalances shall be provided as necessary to maintain stability of pile driver rigs.

(q) Ladders constructed in compliance with this chapter shall be installed on all pile drivers from the hoist platform to the head block, and in such position that workers using ladders will not come in contact with lines, sheaves, etc.

(r) Drop hammers which have been chipped on the face shall not be used for pile driving.

(s) Groove worn drums or spools shall be replaced or properly repaired to present a smooth working surface.

(t) At least two full wraps of cable shall be maintained on hoisting drums.

(u) Proper racks shall be provided for storage of cross-cut saws.

(v) Every hoisting drum used as a pile driver shall be equipped with manually operated dogs or pawls to hold suspended loads. Foot brakes shall only be used to hold suspended loads until drum dogs are engaged. The dogs shall be visible from the operator's station or be equipped with a positive direct connected telltale which shall be visible to the operator.

(w) No counterweight or spring arrangement on dogs shall be permitted which would allow dog to be automatically disengaged either by relieving the load or rolling the drum.

(x) In every crew there shall be designated signalperson. The driver operator or drum person shall receive signals from no others, except when loftworker is above. The hammer shall not be lowered except on the loftworker's signal.

(y) Spliced hammer lines shall not be used.

(2) Pile driving from barges and floats. Barges or floats supporting pile driving operations shall meet the applicable requirements of WAC 296-155-630.

(3) Pile driving equipment.

(a) Engineers and winchperson shall accept signals only from the designated signalperson.

(b) All employees shall be kept clear when piling is being hoisted into the leads.

(c) When piles are being driven in an excavated pit, the walls of the pit shall be sloped to the angle of repose or sheet-piled and braced.

(d) When steel tube piles are being "blown out," employees shall be kept well beyond the range of falling materials.

(e) When it is necessary to cut off the tops of driven piles, pile driving operations shall be suspended except where the cutting operations are located at least twice the length of the longest pile from the driver.

(f) When driving jacked piles, all access pits shall be provided with ladders and bulkheaded curbs to prevent material from falling into the pit.

(g) Floating equipment such as dredges and pile drivers shall maintain a signal system to shore in the event of an emergency.

(h) The distribution of machinery on floating equipment shall be such that the completed unit floats on an even keel.

(i) Fuel tanks below decks shall be vented to outside of hull and vents shall be equipped with flame arrestors.

(j) All hull compartments shall be ventilated. No person shall work in hull compartments until it is shown the compartments contain no flammable or toxic concentrations.

(k) Light fixtures installed or used within the hull shall be explosion proof.

(l) All floating rigs shall be equipped with ladderways extending from the deck to the waterline where the deck is more than 36 inches above the water. A wire rope shall be hung along both sides of the hull or float and so hung that it shall be at all times near or at the waterline.

(m) Doors of deck houses where deck house sets within 36" of edge of deck and doorways in hull shall be equipped with guard rails or cross chains.

(n) Deck houses shall have a substantial grab rail installed on all sides where such installation will not interfere with operations.

(o) Pile driver and dredge fairlead sheaves, and spudline sheaves shall be guarded to prevent workers or tools being drawn into them.

(p) All work deck shall be kept clear of debris, unnecessary tools and equipment in order to minimize the stumbling hazard. Lines shall be coiled, tools stored and material stacked clear of working spaces.

(q) Night operations shall be adequately lighted for all activity while work is in progress and shall be maintained until workers leave the work area.

(r) Electrical installation and equipment shall be installed and maintained in compliance with the National Electric Code.

(s) All walkways over water and on dredge pontoon discharge pipe lines shall be a minimum of 20" in width with standard handrail along one side on structures and gang planks. Walkways on pontoon lines may be equipped with hand lines in lieu of standard handrail.

(t) Adequate fire extinguishing equipment shall be provided and maintained in a serviceable condition.

(u) Protective equipment shall be used when working with creosote timbers. Protective creams shall be used on exposed skin surfaces and gloves and eye protection worn especially when driving piles.

(v) Pulling piles with hammer or pile line rigged through the head block is prohibited unless driver and rigging are designed to safely withstand the imposed strain.

(w) Truck runways and platforms shall be equipped with a wheel guard on all outside edges. Top of wheel guards shall be a minimum of 10 inches above deck.

(x) Use of foot blocks at base of leads for hammer line or pile line is prohibited.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-620, filed 7/20/94, effective 9/20/94; 91-03-044 (Order 90-18), § 296-155-620, filed 1/10/91, effective 2/12/91; Order 76-29, § 296-155-620, filed 9/30/76; Order 74-26, § 296-155-620, filed 5/7/74, effective 6/6/74.]

WAC 296-155-625 Site clearing. (1) General.

(a) The word "clearing" means the removal of trees, stumps, logs, brush, debris and rubbish from the surface of the ground in preparation of a site for construction work of any kind. The removal of trees and logs shall be in accordance with the requirements of chapter 296-54 WAC.

(b) All equipment and tools such as axes, sledges, wedges, saws, springboards, etc., shall be maintained in a safe condition and guarded with standard safeguards.

(c) Fallers shall give warning to brushing crews, buckers and other persons in the vicinity where a tree is being felled; taking notice that such persons are not only out of the reach of tree, but also out of danger of possible sidewinders, snags or other trees which may be knocked over by the tree being felled.

(d) No tree shall be felled toward and within range of traveled road or railroad in use, unless a flagger is placed on such road or railroad to warn all approaching persons or to stop vehicles.

(e) Clearing crews shall not be placed immediately below other crews working on hillsides where there is a possible danger of skidding or rolling trees, moving earth or rock.

(f) Pioneer roads on clearing operations shall be constructed to safely accommodate all equipment moved over road.

(g) Hazardous standing and down timber, rocks, etc., shall be moved from upper sides of cuts on side hill operations.

(h) Care shall be exercised in the use of oil for burning brush or timber.

(i) Employees engaged in site clearing shall be protected from hazards of irritant and toxic plants and suitably instructed in the first-aid treatment available.

(j) All equipment used in site clearing operations shall be equipped with rollover guards meeting the requirements of this chapter. In addition, rider-operated equipment shall be equipped with an overhead and rear canopy guard meeting the following requirements:

(i) The overhead covering on this canopy structure shall be of not less than 1/8-inch steel plate or 1/4-inch woven wire mesh with openings no greater than 1 inch, or equivalent.

(ii) The opening in the rear of the canopy structure shall be covered with not less than 1/4-inch woven wire mesh with openings no greater than 1 inch.

(iii) Use of 1/2 inch thick plastic sheets or other thicknesses of plastic panels derived from polycarbonate, acrylic, cellulose acetate butyrate which provides equivalent or better protection against particular hazards involved is acceptable in lieu of 1 or 1 3/4 inch open mesh material.

(A) All panels shall be installed in a manner which can withstand the initial impact, and maintain the protective barrier integrity; and

(B) All panels must be labeled or marked to distinguish between acceptable and inferior materials.

(k) In addition to observance of the general safety and health standards;

(i) The employer shall assume the responsibility of work assignment so that no worker shall be required to work in a position or location so isolated as to not be within ordinary calling distance of another person who can render assistance in case of emergency. In any operation where cutting, felling trees, loading, or a combination of these duties is carried on, there shall be a minimum crew of two persons who shall work as a team and shall be in visual or voice contact with one another. If one worker at these operations is required to be left alone for a period of time, the worker

shall be contacted by another person at reasonable intervals not to exceed fifteen minutes unless such practice can be established to be impractical.

(ii) This does not apply to operators of motor vehicles, watchpersons or certain other jobs which, by their nature, are singular worker assignments. However, a definite procedure for checking the welfare of all workers during working hours shall be instituted and all workers so advised.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-625, filed 7/20/94, effective 9/20/94; 91-03-044 (Order 90-18), § 296-155-625, filed 1/10/91, effective 2/12/91. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-625, filed 1/21/86; Order 74-26, § 296-155-625, filed 5/7/74, effective 6/6/74.]

WAC 296-155-630 Marine operations and equipment. (1) Material handling operations.

Operations fitting the definition of "material handling" shall be performed in conformance with applicable requirements of "Safety and health regulations for longshoring." The term "longshoring operations" means the loading, unloading, moving, or handling of construction materials, equipment and supplies, etc. into, in, on, or out of any vessel, from a fixed structure or shore-to-vessel, vessel-to-shore or fixed structure or vessel-to-vessel.

(2) Access to barges.

(a) Ramps for access of vehicles to or between barges shall be of adequate strength, provided with side boards, well maintained, and properly secured.

(b) Unless employees can step safely to or from the wharf, float, barge, or river towboat, either a ramp, meeting the requirements of (a) of this subsection, or a safe walkway, shall be provided.

(c) Jacob's ladders shall be of the double rung or flat tread type. They shall be well maintained and properly secured.

(d) A Jacob's ladder shall either hang without slack from its lashings or be pulled up entirely.

(e) When the upper end of the means of access rests on or is flush with the top of the bulwark, substantial steps, properly secured and equipped with at least one substantial hand rail approximately 33 inches in height, shall be provided between the top of the bulwark and the deck.

(f) Obstructions shall not be laid on or across the gangway.

(g) The means of access shall be adequately illuminated for its full length.

(h) Unless the structure makes it impossible, the means of access shall be so located that the load will not pass over employees.

(3) Working surfaces of barges.

(a) Employees shall not be permitted to walk along the sides of covered lighters or barges with coamings more than 5 feet high, unless there is a 3-foot clear walkway, or a grab rail, or a taut handline is provided.

(b) Decks and other working surfaces shall be maintained in a safe condition.

(c) Employees shall not be permitted to pass fore and aft, over, or around deckloads, unless there is a safe passage.

(d) Employees shall not be permitted to walk over deckloads from rail to coaming unless there is a safe passage. If it is necessary to stand at the outboard or inboard edge of the deckload where less than 24 inches of

bulwark, rail, coaming, or other protection exists, all employees shall be provided with a suitable means of protection against falling from the deckload.

(4) First-aid and lifesaving equipment.

(a) Provisions for rendering first aid and medical assistance shall be in accordance with Part B of this Chapter.

(b) The employer shall ensure that there is in the vicinity of each barge in use at least one U.S. Coast Guard-approved 30-inch life ring with not less than 90 feet of line attached, and at least one portable or permanent ladder which will reach the top of the apron to the surface of the water. If the above equipment is not available at the pier, the employer shall furnish it during the time that the employer is working the barge.

(c) Employees walking or working on the unguarded decks of barges shall be protected with U.S. Coast Guard-approved personal flotation devices such as Type I PFD, Type II PFD, Type III PFD, or Type V PFD, or their equivalent, pursuant to 46 CFR 160 (Coast Guard Lifesaving Equipment Specifications) and 33 CFR 175.23 (Coast Guard table of devices equivalent to personal flotation devices). Ski belt or inflatable type personal flotation devices are specifically prohibited.

(5) Diving operations. (Reserved.)

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-630, filed 7/20/94, effective 9/20/94; Order 76-29, § 296-155-630, filed 9/30/76; Order 74-26, § 296-155-630, filed 5/7/74, effective 6/6/74.]

PART N

EXCAVATION, TRENCHING, AND SHORING

WAC 296-155-650 Scope, application, and definitions applicable to this part. (1) Scope and application. This part applies to all open excavations made in the earth's surface. Excavations are defined to include trenches.

(2) Definitions applicable to this part.

(a) "Accepted engineering requirements or practices." Those requirements which are compatible with standards of practice required by a registered professional engineer.

(b) "Aluminum hydraulic shoring." A preengineered shoring system comprised of aluminum hydraulic cylinders (crossbraces) used in conjunction with vertical rails (uprights) or horizontal rails (walers). Such system is designed, specifically to support the sidewalls of an excavation and prevent cave-ins.

(c) "Bell-bottom pier hole." A type of shaft or footing excavation, the bottom of which is made larger than the cross section above to form a belled shape.

(d) "Benching (benching system)." A method of protecting employees from cave-ins by excavating the sides of an excavation to form one or a series of horizontal levels or steps, usually with vertical or near-vertical surfaces between levels.

(e) "Cave-in." The separation of a mass of soil or rock material from the side of an excavation, or loss of soil from under a trench shield or support system, and its sudden movement into the excavation in quantity that it could entrap, bury, injure, or immobilize a person.

(f) "Competent person." One who can identify existing or predictable hazards in the surroundings that are unsanitary, hazardous, or dangerous to employees. Also has

authorization or authority by the nature of their position to take prompt corrective measures to eliminate them. The person shall be knowledgeable in the requirements of this part.

(g) "Cross braces." The horizontal members of a shoring system installed perpendicular to the sides of the excavation, the ends of which bear against either uprights or walers.

(h) "Excavation." Any person-made cut, cavity, trench, or depression in the earth's surface, formed by earth removal.

(i) "Faces or sides." The vertical or inclined earth surfaces formed as a result of excavation work.

(j) "Failure." The breakage, displacement, or permanent deformation of a structural member or connection so as to reduce its structural integrity and its supportive capabilities.

(k) "Hazardous atmosphere." A atmosphere which by reason of being explosive, flammable, poisonous, corrosive, oxidizing, irritating, oxygen deficient, toxic, or otherwise harmful, may cause death, illness, or injury.

(l) "Kickouts." Accidental release or failure of a cross brace.

(m) "Protective system." A method of protecting employees from cave-ins, from material that could fall or roll from an excavation face or into an excavation, or from the collapse of adjacent structures. Protective systems include support systems, sloping and benching systems, shield systems, and other systems that provide the necessary protection.

(n) "Ramp." An inclined walking or working surface that is used to gain access to one point to another, and is constructed from earth or from structural materials such as steel or wood.

(o) "Registered professional engineer." A person who is registered as a professional engineer in the state of Washington. The registered professional engineer shall comply with the Washington state department of licensing requirements, chapter 18.43 RCW.

(p) "Sheeting." The members of a shoring system that retain the earth in position and in turn are supported by other members of the shoring system.

(q) "Shield (shield system)." A structure that is able to withstand the forces imposed on it by a cave-in and thereby protect employees within the structure. Shields can be permanent structures or can be designed to be portable and moved along as work progresses. Additionally, shields can be either premanufactured or job-built in accordance with WAC 296-155-657 (3)(c) or (d). Shields used in trenches are usually referred to as "trench boxes" or "trench shields."

(r) "Shoring (shoring system)." A structure such as a metal hydraulic, mechanical, or timber shoring system that supports the sides of an excavation and which is designed to prevent cave-ins.

(s) "Sides." See "faces."

(t) "Sloping (sloping system)." A method of protecting employees from cave-ins by excavating to form sides of an excavation that are inclined away from the excavation so as to prevent cave-ins. The angle of incline required to prevent a cave-in varies with differences in such factors as the soil type, environmental conditions of exposure, and application of surcharge loads.

(u) "Stable rock." A natural solid mineral material that can be excavated with vertical sides and will remain intact while exposed. Unstable rock is considered to be stable when the rock material on the side or sides of the excavation is secured against caving-in or movement by rock bolts or by another protective system that has been designed by a registered professional engineer.

(v) "Structural ramp." A ramp built of steel or wood, usually used for vehicle access. Ramps made of soil or rock are not considered structural ramps.

(w) "Support system." A structure such as underpinning, bracing or shoring, which provides support to an adjacent structure, underground installation, or the sides of an excavation.

(x) "Tabulated data." Tables and charts approved by a registered professional engineer and used to design and construct a protective system.

(y) "Trench (trench excavation)." A narrow excavation in relation to its length made below the surface of the ground. In general, the depth is greater than the width, but the width of a trench (measured at the bottom) is not greater than 15 feet (4.6m). If forms or other structures are installed or constructed in an excavation so as to reduce the dimension measured from the forms or structure to the side of the excavation to 15 feet (4.6 m) or less (measured at the bottom of the excavation), the excavation is also considered to be a trench.

(z) Trench box. See "shield."

(aa) "Trench shield." See "shield."

(bb) "Uprights." The vertical members of a trench shoring system placed in contact with the earth and usually positioned so that individual members do not contact each other. Uprights placed so that individual members are closely spaced, in contact with or interconnected to each other, are often called "sheeting."

(cc) "Wales." Horizontal members of a shoring system placed parallel to the excavation face whose sides bear against the vertical members of the shoring system or earth.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-650, filed 7/20/94, effective 9/20/94. Statutory Authority: Chapter 49.17 RCW and RCW 49.17.040, [49.17].050 and [49.17].060. 92-22-067 (Order 92-06), § 296-155-650, filed 10/30/92, effective 12/8/92. Statutory Authority: Chapter 49.17 RCW. 91-03-044 (Order 90-18), § 296-155-650, filed 1/10/91, effective 2/12/91. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-650, filed 1/21/86. Statutory Authority: RCW 49.17.040, 49.17.050 and 49.17.240. 81-13-053 (Order 81-9), § 296-155-650, filed 6/17/81; Order 74-26, § 296-155-650, filed 5/7/74, effective 6/6/74.]

WAC 296-155-655 General protection requirements. (1) Surface encumbrances. All surface encumbrances that are located so as to create a hazard to employees shall be removed or supported, as necessary, to safeguard employees.

(2) Underground installations.

(a) The location of utility installations, such as sewer, telephone, fuel, electric, water lines, or any other underground installations that reasonably may be expected to be encountered during excavation work, shall be located prior to opening an excavation.

(b) Utility companies or owners shall be contacted within established or customary local response times, advised

of the proposed work, and asked to locate the underground utility installation prior to the start of actual excavation.

(c) When excavation operations approach the location of underground installations, the exact location of the installations shall be determined by safe and acceptable means.

(d) While the excavation is open, underground installations shall be protected, supported, or removed as necessary to safeguard employees.

(3) Access and egress.

(a) Structural ramps.

(i) Structural ramps that are used solely by employees as a means of access or egress from excavations shall be designed by a competent person. Structural ramps used for access or egress of equipment shall be designed by a competent person qualified in structural design, and shall be constructed in accordance with the design.

(ii) Ramps and runways constructed of two or more structural members shall have the structural members connected together to prevent displacement.

(iii) Structural members used for ramps and runways shall be of uniform thickness.

(iv) Cleats or other appropriate means used to connect runway structural members shall be attached to the bottom of the runway or shall be attached in a manner to prevent tripping.

(v) Structural ramps used in lieu of steps shall be provided with cleats or other surface treatments on the top surface to prevent slipping.

(b) Means of egress from trench excavations. A stairway, ladder, ramp or other safe means of egress shall be located in trench excavations that are 4 feet (1.22 m) or more in depth so as to require no more than 25 feet (7.62 m) of lateral travel for employees.

(4) Exposure to vehicular traffic. Employees exposed to public vehicular traffic shall be provided with, and shall wear, warning vests or other suitable garments marked with or made of reflectorized or high-visibility material.

(5) Exposure to falling loads. No employee shall be permitted underneath loads handled by lifting or digging equipment. Employees shall be required to stand away from any vehicle being loaded or unloaded to avoid being struck by any spillage or falling materials. Operators may remain in the cabs of vehicles being loaded or unloaded when the vehicles are equipped, in accordance with WAC 296-155-610 (2)(g), to provide adequate protection for the operator during loading and unloading operations.

(6) Warning system for mobile equipment. When mobile equipment is operated adjacent to an excavation, or when such equipment is required to approach the edge of an excavation, and the operator does not have a clear and direct view of the edge of the excavation, a warning system shall be utilized such as barricades, hand or mechanical signals, or stop logs. If possible, the grade should be away from the excavation.

(7) Hazardous atmospheres.

(a) Testing and controls. In addition to the requirements set forth in parts B-1, C, and C-1 of this chapter (296-155 WAC) to prevent exposure to harmful levels of atmospheric contaminants and to assure acceptable atmospheric conditions, the following requirements shall apply:

(i) Where oxygen deficiency (atmospheres containing less than 19.5 percent oxygen) or a hazardous atmosphere

exists or could reasonably be expected to exist, such as in excavations in landfill areas or excavations in areas where hazardous substances are stored nearby, the atmospheres in the excavation shall be tested before employees enter excavations greater than 4 feet (1.22 m) in depth.

(ii) Adequate precautions shall be taken to prevent employee exposure to atmospheres containing less than 19.5 percent oxygen and other hazardous atmospheres. These precautions include providing proper respiratory protection or ventilation in accordance with parts B-1 and C of this chapter respectively.

(iii) Adequate precaution shall be taken such as providing ventilation, to prevent employee exposure to an atmosphere containing a concentration of a flammable gas in excess of 20 percent of the lower flammable limit of the gas.

(iv) When controls are used that are intended to reduce the level of atmospheric contaminants to acceptable levels, testing shall be conducted as often as necessary to ensure that the atmosphere remains safe.

(b) Emergency rescue equipment.

(i) Emergency rescue equipment, such as breathing apparatus, a safety harness and line, or a basket stretcher, shall be readily available where hazardous atmospheric conditions exist or may reasonably be expected to develop during work in an excavation. This equipment shall be attended when in use.

(ii) Employees entering bell-bottom pier holes, or other similar deep and confined footing excavations, shall wear a harness with a lifeline securely attached to it. The lifeline shall be separate from any line used to handle materials, and shall be individually attended at all times while the employee wearing the lifeline is in the excavation.

Note: See chapter 296-62 WAC, Part M for additional requirements applicable to confined space operations.

(8) Protection from hazards associated with water accumulation.

(a) Employees shall not work in excavations in which there is accumulated water, or in excavations in which water is accumulating, unless adequate precautions have been taken to protect employees against the hazards posed by water accumulation. The precautions necessary to protect employees adequately vary with each situation, but could include special support or shield systems to protect from cave-ins, water removal to control the level of accumulating water, or use of a safety harness and lifeline.

(b) If water is controlled or prevented from accumulating by the use of water removal equipment, the water removal equipment and operations shall be monitored by a competent person to ensure proper operation.

(c) If excavation work interrupts the natural drainage of surface water (such as streams), diversion ditches, dikes, or other suitable means shall be used to prevent surface water from entering the excavation and to provide adequate drainage of the area adjacent to the excavation. Excavations subject to runoff from heavy rains will require an inspection by a competent person and compliance with subdivisions (a) and (b) of this subsection.

(9) Stability of adjacent structures.

(a) Where the stability of adjoining buildings, walls, or other structures is endangered by excavation operations, support systems such as shoring, bracing, or underpinning

shall be provided to ensure the stability of such structures for the protection of employees.

(b) Excavation below the level of the base or footing of any foundation or retaining wall that could be reasonably expected to pose a hazard to employees shall not be permitted except when:

(i) A support system, such as underpinning, is provided to ensure the safety of employees and the stability of the structure; or

(ii) The excavation is in stable rock; or

(iii) A registered professional engineer has approved the determination that the structure is sufficiently removed from the excavation so as to be unaffected by the excavation activity; or

(iv) A registered professional engineer has approved the determination that such excavation work will not pose a hazard to employees.

(c) Sidewalks, pavements, and appurtenant structure shall not be undermined unless a support system or another method of protection is provided to protect employees from the possible collapse of such structures.

(10) Protection of employees from loose rock or soil.

(a) Adequate protection shall be provided to protect employees from loose rock or soil that could pose a hazard by falling or rolling from an excavation face. Such protection shall consist of scaling to remove loose material; installation of protective barricades at intervals as necessary on the face to stop and contain falling material; or other means that provide equivalent protection.

(b) Employees shall be protected from excavated or other materials or equipment that could pose a hazard by falling or rolling into excavations. Protection shall be provided by placing and keeping such materials or equipment at least 2 feet (.61 m) from the edge of excavations, or by the use of retaining devices that are sufficient to prevent materials or equipment from falling or rolling into excavations, or by a combination of both if necessary.

(11) Inspections.

(a) Daily inspections of excavations, the adjacent areas, and protective systems shall be made by a competent person for evidence of a situation that could result in possible cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. An inspection shall be conducted by the competent person prior to the start of work and as needed throughout the shift. Inspections shall also be made after every rainstorm or other hazard increasing occurrence. These inspections are only required when employee exposure can be reasonably anticipated.

(b) Where the competent person finds evidence of a situation that could result in a possible cave-in, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions, exposed employees shall be removed from the hazardous area until the necessary precautions have been taken to ensure their safety.

(12) Fall protection.

(a) Walkways shall be provided where employees or equipment are required or permitted to cross over excavations. Guardrails which comply with chapter 296-155 WAC, Part K shall be provided where walkways are 4 feet or more above lower levels.

(b) Adequate barrier physical protection shall be provided at all remotely located excavations. All wells, pits,

shafts, etc., shall be barricaded or covered. Upon completion of exploration and similar operations, temporary wells, pits, shafts, etc., shall be backfilled.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-24-051, § 296-155-655, filed 11/27/96, effective 2/1/97. Statutory Authority: Chapter 49.17 RCW. 95-10-016, § 296-155-655, filed 4/25/95, effective 10/1/95. Statutory Authority: Chapter 49.17 RCW and RCW 49.17.040, [49.17.]050 and [49.17.]060. 92-22-067 (Order 92-06), § 296-155-655, filed 10/30/92, effective 12/8/92. Statutory Authority: Chapter 49.17 RCW. 91-03-044 (Order 90-18), § 296-155-655, filed 1/10/91, effective 2/12/91. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-655, filed 1/21/86. Statutory Authority: RCW 49.17.040, 49.17.050 and 49.17.240. 81-13-053 (Order 81-9), § 296-155-655, filed 6/17/81; Order 76-29, § 296-155-655, filed 9/30/76; Order 74-26, § 296-155-655, filed 5/7/74, effective 6/6/74.]

WAC 296-155-657 Requirements for protective systems. (1) Protection of employees in excavations.

(a) Each employee in an excavation shall be protected from cave-ins by an adequate protective system designed in accordance with subsections (2) or (3) of this section except when:

- (i) Excavations are made entirely in stable rock; or
- (ii) Excavations are less than 4 feet (1.22m) in depth and examination of the ground by a competent person provides no indication of a potential cave-in.

(b) Protective systems shall have the capacity to resist without failure all loads that are intended or could reasonably be expected to be applied or transmitted to the system.

(2) Design of sloping and benching systems. The slopes and configurations of sloping and benching systems shall be selected and constructed by the employer or employer's designee and shall be in accordance with the requirements of subdivision (a); or, in the alternative, subdivision (b); or, in the alternative, subdivision (c); or, in the alternative, subdivision (d), as follows:

(a) Option 1—Allowable configurations and slopes.

(i) Excavations shall be sloped at an angle not steeper than one and one-half horizontal to one vertical (34 degrees measured from the horizontal), unless the employer uses one of the other options listed below.

(ii) Slopes specified in item (i) of this subdivision, shall be excavated to form configurations that are in accordance with the slopes shown for Type C soil in Appendix B to this part.

(b) Option 2—Determination of slopes and configurations using Appendices A and B. Maximum allowable slopes, and allowable configurations for sloping and benching systems, shall be determined in accordance with the conditions and requirements set forth in appendices A and B to this part.

(c) Option 3—Designs using other tabulated data.

(i) Designs of sloping or benching systems shall be selected from and be in accordance with tabulated data, such as tables and charts.

(ii) The tabulated data shall be in written form and shall include all of the following:

(A) Identification of the parameters that affect the selection of a sloping or benching system drawn from such data;

(B) Identification of the limits of use of the data, to include the magnitude and configuration of slopes determined to be safe;

(C) Explanatory information as may be necessary to aid the user in making a correct selection of a protective system from the data.

(iii) At least one copy of the tabulated data which identifies the registered professional engineer who approved the data, shall be maintained at the jobsite during construction of the protective system. After that time the data may be stored off the jobsite, but a copy of the data shall be made available to the director upon request.

(d) Option 4—Design by a registered professional engineer.

(i) Sloping and benching systems not utilizing Option 1 or Option 2 or Option 3 under subsection (2) of this section shall be approved by a registered professional engineer.

(ii) Designs shall be in written form and shall include at least the following:

(A) The magnitude of the slopes that were determined to be safe for the particular project;

(B) The configurations that were determined to be safe for the particular project; and

(C) The identity of the registered professional engineer approving the design.

(iii) At least one copy of the design shall be maintained at the jobsite while the slope is being constructed. After that time the design need not be at the jobsite, but a copy shall be made available to the director upon request.

(3) Design of support systems, shield systems, and other protective systems. Designs of support systems, shield systems, and other protective systems shall be selected and constructed by the employer or employer's designee and shall be in accordance with the requirements of subdivision (a); or, in the alternative, subdivision (b); or, in the alternative, subdivision (c); or, in the alternative, subdivision (d) as follows:

(a) Option 1—Designs using appendices A, C, and D. Designs for timber shoring in trenches shall be determined in accordance with the conditions and requirements set forth in appendices A and C to this part. Designs for aluminum hydraulic shoring shall be in accordance with subdivision (b) of this subsection, but if manufacturer's tabulated data cannot be utilized, designs shall be in accordance with appendix D.

(b) Option 2—Designs using manufacturer's tabulated data.

(i) Design of support systems, shield systems, or other protective systems that are drawn from manufacturer's tabulated data shall be in accordance with all specifications, recommendations, and limitations issued or made by the manufacturer.

(ii) Deviation from the specifications, recommendations, and limitations issued or made by the manufacturer shall only be allowed after the manufacturer issues specific written approval.

(iii) Manufacturer's specifications, recommendations, and limitations, and manufacturer's approval to deviate from the specifications, recommendations, and limitations shall be in written form at the jobsite during construction of the protective system. After that time this data may be stored off the jobsite, but a copy shall be made available to the director upon request.

(c) Option 3—Designs using other tabulated data.

(i) Designs of support systems, shield systems, or other protective systems shall be selected from and be in accordance with tabulated data, such as tables and charts.

(ii) The tabulated data shall be in written form and include all of the following:

(A) Identification of the parameters that affect the selection of a protective system drawn from such data;

(B) Identification of the limits of use of the data;

(C) Explanatory information as may be necessary to aid the user in making a correct selection of a protective system from the data.

(iii) At least one copy of the tabulated data, which identifies the registered professional engineer who approved the data, shall be maintained at the jobsite during construction of the protective system. After that time the data may be stored off the jobsite, but a copy of the data shall be made available to the director upon request.

(d) Option 4—Design by a registered professional engineer.

(i) Support systems, shield systems, and other protective systems not utilizing Option 1, Option 2 or Option 3, above, shall be approved by a registered professional engineer.

(ii) Designs shall be in written form and shall include the following:

(A) A plan indicating the sizes, types, and configurations of the materials to be used in the protective system; and

(B) The identity of the registered professional engineer approving the design.

(iii) At least one copy of the design shall be maintained at the jobsite during construction of the protective system. After that time, the design may be stored off the jobsite, but a copy of the design shall be made available to the director upon request.

(4) Materials and equipment.

(a) Materials and equipment used for protective systems shall be free from damage or defects that might impair their proper function.

(b) Manufactured materials and equipment used for protective systems shall be used and maintained in a manner that is consistent with the recommendations of the manufacturer, and in a manner that will prevent employee exposure to hazards.

(c) When material or equipment that is used for protective systems is damaged, a competent person shall examine the material or equipment and evaluate its suitability for continued use. If the competent person cannot assure the material or equipment is able to support the intended loads or is otherwise suitable for safe use, then such material or equipment shall be removed from service, and shall be evaluated and approved by a registered professional engineer before being returned to service.

(5) Installation and removal of support.

(a) General.

(i) Members of support systems shall be securely connected together to prevent sliding, falling, kickouts, or other predictable failure.

(ii) Support systems shall be installed and removed in a manner that protects employees from cave-ins, structural collapses, or from being struck by members of the support system.

(iii) Individual members of support systems shall not be subjected to loads exceeding those which those members were designed to withstand.

(iv) Before temporary removal of individual members begins, additional precautions shall be taken to ensure the safety of employees, such as installing other structural members to carry the loads imposed on the support system.

(v) Removal shall begin at, and progress from, the bottom of the excavation. Members shall be released slowly so as to note any indication of possible failure of the remaining members of the structure or possible cave-in of the sides of the excavation.

(vi) Backfilling shall progress together with the removal of support systems from excavations.

(b) Additional requirements for support systems for trench excavations.

(i) Excavation of material to a level no greater than 2 feet (.61 m) below the bottom of the members of a support system shall be permitted, but only if the system is designed to resist the forces calculated for the full depth of the trench, and there are no indications while the trench is open of a possible loss of soil from behind or below the bottom of the support system.

(ii) Installation of a support system shall be closely coordinated with the excavation of trenches.

(6) Sloping and benching systems. Employees shall not be permitted to work on the faces of sloped or benched excavations at levels above other employees except when employees at the lower levels are adequately protected from the hazard of falling, rolling, or sliding material or equipment.

(7) Shield systems.

(a) General.

(i) Shield systems shall not be subjected to loads exceeding those which the system was designed to withstand.

(ii) Shields shall be installed in a manner to restrict lateral or other hazardous movement of the shield in the event of the application of sudden lateral loads.

(iii) Employees shall be protected from the hazard of cave-ins when entering or exiting the areas protected by shields.

(iv) Employees shall not be allowed in shields when shields are being installed, removed, or moved vertically.

(b) Additional requirement for shield systems used in trench excavations. Excavations of earth material to a level not greater than 2 feet (.61 m) below the bottom of a shield shall be permitted, but only if the shield is designed to resist the forces calculated for the full depth of the trench, and there are no indications while the trench is open of a possible loss of soil from behind or below the bottom of the shield.

[Statutory Authority: Chapter 49.17 RCW and RCW 49.17.040, [49.17].050 and [49.17].060. 92-22-067 (Order 92-06), § 296-155-657, filed 10/30/92, effective 12/8/92. Statutory Authority: Chapter 49.17 RCW. 91-03-044 (Order 90-18), § 296-155-657, filed 1/10/91, effective 2/12/91.]

WAC 296-155-66103 Reserved.

[Statutory Authority: Chapter 49.17 RCW and RCW 49.17.040, [49.17].050 and [49.17].060. 92-22-067 (Order 92-06), § 296-155-66103, filed 10/30/92, effective 12/8/92. Statutory Authority: Chapter 49.17 RCW. 91-03-044 (Order 90-18), § 296-155-66103, filed 1/10/91, effective 2/12/91.]

WAC 296-155-66105 Reserved.

[Statutory Authority: Chapter 49.17 RCW and RCW 49.17.040, [49.17].050 and [49.17].060. 92-22-067 (Order 92-06), § 296-155-66105, filed 10/30/92, effective 12/8/92. Statutory Authority: Chapter 49.17 RCW. 91-03-044 (Order 90-18), § 296-155-66105, filed 1/10/91, effective 2/12/91.]

WAC 296-155-66109 Reserved.

[Statutory Authority: Chapter 49.17 RCW and RCW 49.17.040, [49.17].050 and [49.17].060. 92-22-067 (Order 92-06), § 296-155-66109, filed 10/30/92, effective 12/8/92. Statutory Authority: Chapter 49.17 RCW. 91-03-044 (Order 90-18), § 296-155-66109, filed 1/10/91, effective 2/12/91.]

WAC 296-155-664 Appendices.

[Statutory Authority: Chapter 49.17 RCW and RCW 49.17.040, [49.17].050 and [49.17].060. 92-22-067 (Order 92-06), § 296-155-664, filed 10/30/92, effective 12/8/92. Statutory Authority: Chapter 49.17 RCW. 91-03-044 (Order 90-18), § 296-155-664, filed 1/10/91, effective 2/12/91.]

WAC 296-155-66401 Appendix A—Soil classification. (1) Scope and application.

(a) Scope. This appendix describes a method of classifying soil and rock deposits based on site and environmental conditions, and on the structure and composition of the earth deposits. The appendix contains definitions, sets forth requirements, and describes acceptable visual and manual tests for use in classifying soils.

(b) Application. This appendix applies when a sloping or benching system is designed in accordance with the requirements set forth in WAC 296-155-657 (2)(b) as a method of protection for employees from cave-ins. This appendix also applies when timber shoring for excavations is designed as a method of protection from cave-ins in accordance with appendix C to part N of this chapter, and when aluminum hydraulic shoring is designed in accordance with appendix D. This Appendix also applies if other protective systems are designed and selected for use from data prepared in accordance with the requirements set forth in WAC 296-155-657(3), and the use of the data is predicated on the use of the soil classification system set forth in this appendix.

(2) Definitions. The definitions and examples given below are based on, in whole or in part, the following; American Society for Testing Materials (ASTM) Standards D653-85 and D2488; The Unified Soils Classification System, The U.S. Department of Agriculture (USDA) Textural Classification Scheme; and The National Bureau of Standards Report BSS-121.

(a) Cemented soil. A soil in which the particles are held together by a chemical agent, such as calcium carbonate such that a hand-size sample cannot be crushed into powder or individual soil particles by finger pressure.

(b) Cohesive soil. Clay (fine grained soil), or soil with a high clay content, which has cohesive strength. Cohesive soil does not crumble, can be excavated with vertical sideslopes, and is plastic when moist. Cohesive soil is hard to break up when dry, and exhibits significant cohesion when submerged. Cohesive soils include clayey silt, sandy clay, silty clay, clay and organic clay.

(c) Dry soil. Soil that does not exhibit visible signs of moisture content.

(d) Fissured. A soil material that has a tendency to break along definite planes of fracture with little resistance,

or a material that exhibits open cracks, such as tension cracks, in an exposed surface.

(e) Granular soil. Gravel, sand, or silt, (coarse grained soil) with little or no clay content. Granular soil has no cohesive strength. Some moist granular soils exhibit apparent cohesion. Granular soil cannot be molded when moist and crumbles easily when dry.

(f) Layered system. Two or more distinctly different soil or rock types arranged in layers. Micaceous seams or weakened planes in rock or shale are considered layered.

(g) Moist soil. A condition in which a soil looks and feels damp. Moist cohesive soil can easily be shaped into a ball and rolled into small diameter threads before crumbling. Moist granular soil that contains some cohesive material will exhibit signs of cohesion between particles.

(h) Plastic. A property of a soil which allows the soil to be deformed or molded without cracking, or appreciable volume change.

(i) Saturated soil. A soil in which the voids are filled with water. Saturation does not require flow. Saturation, or near saturation, is necessary for the proper use of instruments such as a pocket penetrometer or shear vane.

(j) Soil classification system. For the purpose of this part, a method of categorizing soil and rock deposits in a hierarchy of Stable Rock, Type A, Type B, and Type C, in decreasing order of stability. The categories are determined based on an analysis of the properties and performance characteristics of the deposits and the environmental conditions of exposure.

(k) Stable rock. Natural solid mineral matter that can be excavated with vertical sides and remain intact while exposed.

(l) Submerged soil. Soil which is underwater or is free seeping.

(m) Type A. Cohesive soils with an unconfined compressive strength of 1.5 ton per square foot (tsf) (144 kPa) or greater. Examples of cohesive soils are: Clay, silty clay, sandy clay, clay loam and, in some cases, silty clay loam and sandy clay loam. Cemented soils such as caliche and hardpan are also considered Type A. No soil is Type A if:

(i) The soil is fissured; or

(ii) The soil is subject to vibration from heavy traffic, pile driving, or similar effects; or

(iii) The soil has been previously disturbed; or

(iv) The soil is part of a sloped, layered system where the layers dip into the excavation on a slope of 4 horizontal to 1 vertical (4H:1V) or greater; or

(v) The material is subject to other factors that would require it to be classified as a less stable material.

(n) Type B.

(i) Cohesive soil with an unconfined compressive strength greater than 0.5 tsf (48 kPa) but less than 1.5 tsf (144 kPa): or

(ii) Granular cohesionless soils including: Angular gravel (similar to crushed rock), silt, silt loam, sandy loam and, in some cases, silty clay loam and sandy clay loam.

(iii) Previously disturbed soils except those which would otherwise be classed as Type C soil.

(iv) Soil that meets the unconfined compressive strength or cementation requirements for Type A, but is fissured or subject to vibration: or

(v) Dry rock that is not stable: or

(vi) Material that is part of a sloped, layered system where the layers dip into the excavation on a slope less steep than 4 horizontal to 1 vertical (4H.1V), but only if the material would otherwise be classified as Type B.

(o) Type C.

(i) Cohesive soil with an unconfined compressive strength of 0.5 tsf (48 kPa) or less: or

(ii) Granular soils including gravel, sand, and loamy sand: or

(iii) Submerged soil or soil from which water is freely seeping: or

(iv) Submerged rock that is not stable, or

(v) Material in a sloped, layered system where the layers dip into the excavation on a slope of 4 horizontal to 1 vertical (4H.1V) or steeper.

(p) Unconfined compressive strength. The load per unit area at which a soil will fail in compression. It can be determined by laboratory testing, or estimated in the field using a pocket penetrometer, by thumb penetration tests, and other methods.

(q) Wet soil. Soil that contains significantly more moisture than moist soil, but in such a range of values that cohesive material will slump or begin to flow when vibrated. Granular material that would exhibit cohesive properties when moist will lose those cohesive properties when wet.

(3) Requirements.

(a) Classification of soil and rock deposits. Each soil and rock deposit shall be classified by a competent person as Stable Rock, Type A, Type B, or Type C in accordance with the definitions set forth in subsection (2) of this section.

(b) Basis of classification. The classification of the deposits shall be made based on the results of at least one visual and at least one manual analysis. Such analyses shall be conducted by a competent person using tests in subsection (4) of this section or in other recognized methods of soil classification and testing such as those adopted by the American Society for Testing Materials, or the U.S. Department of Agriculture textural classification system.

(c) Visual and manual analyses. The visual and manual analyses, such as those noted as being acceptable in subsection (4) of this section, shall be designed and conducted to provide sufficient quantitative and qualitative information as may be necessary to identify properly the properties, factors, and conditions affecting the classification of the deposits.

(d) Layered systems. In a layered system, the system shall be classified in accordance with its weakest layer. However, each layer may be classified individually where a more stable layer lies under a less stable layer.

(e) Reclassification. If, after classifying a deposit, the properties, factors, or conditions affecting its classification change in any way, the changes shall be evaluated by a competent person. The deposit shall be reclassified as necessary to reflect the changed circumstances.

(4) Acceptable visual and manual tests.

(a) Visual tests. Visual analysis is conducted to determine qualitative information regarding the excavation site in general, the soil adjacent to the excavation, the soil forming the sides of the open excavation, and the soil taken as samples from excavated material.

(i) Observe samples of soil that are excavated and soil in the sides of the excavation. Estimate the range of particle sizes and the relative amounts of the particle sizes. Soil that

is primarily composed of fine-grained material is cohesive material. Soil composed primarily of coarse-grained sand or gravel is granular material.

(ii) Observe soil as it is excavated. Soil that remains in clumps when excavated is cohesive. Soil that breaks up easily and does not stay in clumps is granular.

(iii) Observe the side of the opened excavation and the surface area adjacent to the excavation. Crack-like openings such as tension cracks could indicate fissured material. If chunks of soil spall off a vertical side, the soil could be fissured. Small spalls are evidence of moving ground and are indications of potentially hazardous situations.

(iv) Observe the area adjacent to the excavation and the excavation itself for evidence of existing utility and other underground structures, and to identify previously disturbed soil.

(v) Observe the opened side of the excavation to identify layered systems. Examine layered systems to identify if the layers slope toward the excavation. Estimate the degree of slope of the layers.

(vi) Observe the area adjacent to the excavation and sides of the open excavation for evidence of surface water, water seeping from the sides of the excavation, or the location of the level of the water table.

(vii) Observe the area adjacent to the excavation and the area within the excavation for sources of vibration that may affect the stability of the excavation face.

(b) Manual tests. Manual analysis of soil samples is conducted to determine quantitative as well as qualitative properties of soil and to provide more information in order to classify soil properly.

(i) Plasticity. Mold a moist or wet sample of soil into a ball and attempt to roll it into threads as thin as 1/8-inch in diameter. Cohesive material can be successfully rolled into threads without crumbling. For example, if at least a 2 inch (50 mm) length of 1/8-inch thread can be held on one end without tearing, the soil is cohesive.

(ii) Dry strength. If the soil is dry and crumbles on its own or with moderate pressure into individual grains or fine powder, it is granular (any combination of gravel, sand, or silt). If the soil is dry and falls into clumps which break up into smaller clumps, but the smaller clumps can only be broken up with difficulty, it may be clay in any combination with gravel, sand or silt. If the dry soil breaks into clumps which do not break up into small clumps and which can only be broken with difficulty, and there is no visual indication the soil is fissured, the soil may be considered unfissured.

(iii) Thumb penetration. The thumb penetration test can be used to estimate the unconfined compressive strength of cohesive soils. (This test is based on the thumb penetration test described in American Society for Testing and Materials (ASTM) Standard designation D2488-"Standard Recommended Practice for Description of Soils (Visual—Manual Procedure).") Type A soils with an unconfined compressive strength of 1.5 tsf can be readily indented by the thumb; however, they can be and penetrated by the thumb only with very great effort. Type C soils with an unconfined compressive strength of 0.5 tsf can be easily penetrated several inches by the thumb, and can be molded by light finger pressure. This test should be conducted on an undisturbed soil sample, such as a large clump of spoil, as soon as practicable after excavation to keep to a minimum the effects

of exposure to drying influences. If the excavation is later exposed to wetting influences (rain, flooding), the classification of the soil must be changed accordingly.

(iv) Other strength tests. Estimates of unconfined compressive strength of soils can also be obtained by use of a pocket penetrometer or by using a hand-operated shear vane.

(v) Drying test. The basic purpose of the drying test is to differentiate between cohesive material with fissures, unfissured cohesive material, and granular material. The procedure for the drying test involves drying a sample of soil that is approximately 1 inch thick (2.54 cm) and 6 inches (15.24 cm) in diameter until it is thoroughly dry:

(A) If the sample develops cracks as it dries, significant fissures are indicated.

(B) Samples that dry without cracking are to be broken by hand. If considerable force is necessary to break a sample, the soil has significant cohesive material content. The soil can be classified as a unfissured cohesive material and the unconfined compressive strength should be determined.

(C) If a sample breaks easily by hand, it is either a fissured cohesive material or a granular material. To distinguish between the two, pulverize the dried clumps of the sample by hand or by stepping on them. If the clumps do not pulverize easily, the material is cohesive with fissures. If they pulverize easily into very small fragments, the material is granular.

[Statutory Authority: Chapter 49.17 RCW and RCW 49.17.040, [49.17].050 and [49.17].060. 92-22-067 (Order 92-06), § 296-155-66401, filed 10/30/92, effective 12/8/92.]

WAC 296-155-66403 Appendix B—Sloping and benching. (1) Scope and application. This appendix contains specifications for sloping and benching when used as methods of protecting employees working in excavations from cave-ins. The requirements of this appendix apply when the design of sloping and benching protective systems is to be performed in accordance with the requirements set forth in WAC 296-155-657 (2)(b).

(2) Definitions.

(a) Actual slope. The slope to which an excavation face is excavated.

(b) Distress. Soil that is in a condition where a cave-in is imminent or is likely to occur. Distress is evidenced by such phenomena as the development of fissures in the face of or adjacent to an open excavation; the subsidence of the edge of an excavation; the slumping of material from the face or the bulging or heaving of material from the bottom of an excavation; the spalling of material from the face of an excavation; and raveling, i.e., small amounts of material suddenly separating from the face of an excavation and trickling or rolling down into the excavation.

(c) Maximum allowable slope. The steepest incline of an excavation face that is acceptable for the most favorable site conditions as protection against cave-ins, and is expressed as the ratio of horizontal distance to vertical rise (H:V).

(3) Requirements.

(a) Soil classification. Soil and rock deposits shall be classified in accordance with appendix A of this Part.

(b) Maximum allowable slope. The maximum allowable slope for a soil or rock deposit shall be determined from Table N-1 of this appendix.

(c) Actual slope.

(i) The actual slope shall not be steeper than the maximum allowable slope.

(ii) The actual slope shall be less steep than the maximum allowable slope, when there are signs of distress. If that situation occurs, the slope shall be cut back to an actual slope which is at least 1/2 horizontal to one vertical (1/2H:1V) less steep than the maximum allowable slope.

(iii) When surcharge loads from stored material or equipment, operating equipment, or traffic are present, a competent person shall determine the degree to which the actual slope must be reduced below the maximum allowable slope, and shall assure that such reduction is achieved. Surcharge loads from adjacent structures shall be evaluated in accordance with WAC 296-155-655(9).

(d) Configurations. Configurations of sloping and benching systems shall be in accordance with Figures N-1 through N-18.

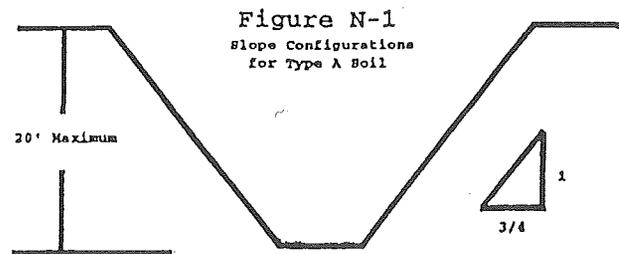
TABLE N-1
MAXIMUM ALLOWABLE SLOPES

SOIL OR ROCK TYPE	MAXIMUM ALLOWABLE SLOPES (H:V) ⁽¹⁾ FOR EXCAVATION LESS THAN 20 FEET DEEP ⁽²⁾
STABLE ROCK	VERTICAL (90°)
TYPE A	3/4:1 (53°)
TYPE B	1:1 (45°)
TYPE C	1 1/2:1 (34°)

NOTES:

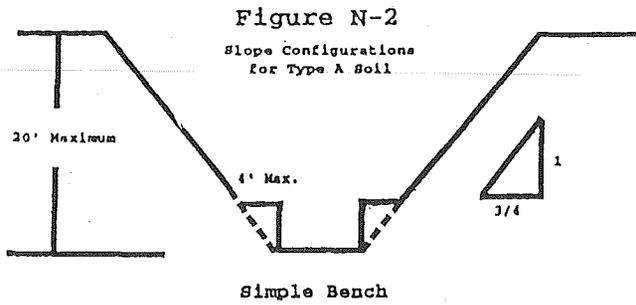
(1) Numbers shown in parentheses next to maximum allowable slopes are angles expressed in degrees from the horizontal. Angles have been rounded off.

(2) Sloping or benching for excavations greater than 20 feet deep shall be designed by a registered professional engineer.

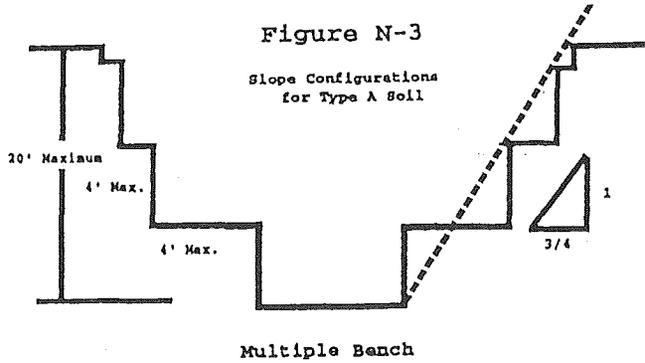


Simple Slope - General

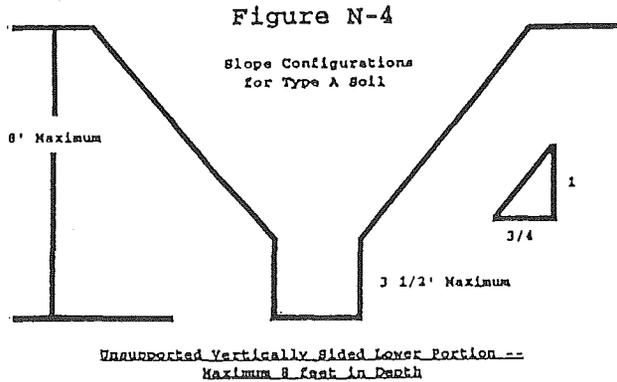
All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 3/4:1



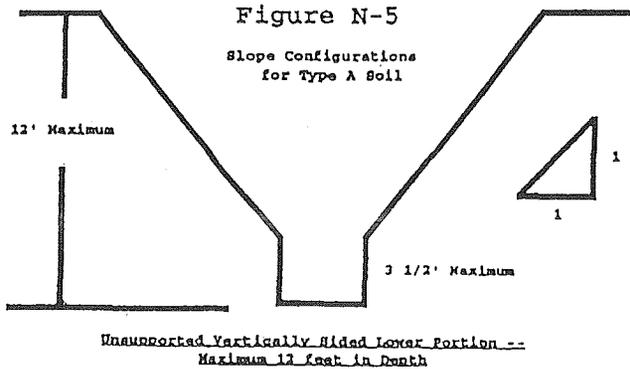
All benched excavations 20 feet or less in depth shall have a maximum allowable slope of 3/4 to 1 and maximum bench dimensions of 4 feet.



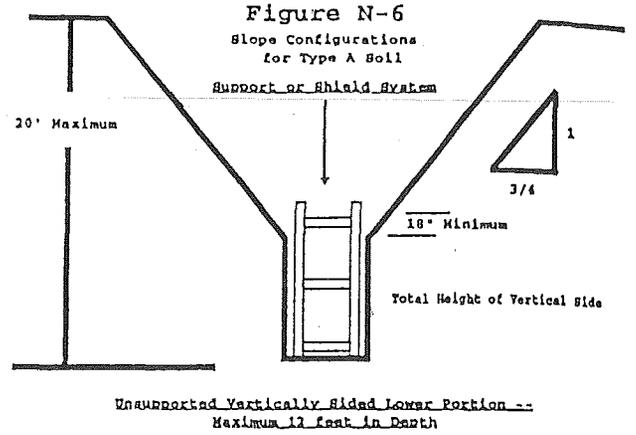
All benched excavations 20 feet or less in depth shall have a maximum allowable slope of 3/4:1 and maximum bench dimensions of 4 feet.



All excavations 8 feet or less in depth which have unsupported vertically sided lower portions shall have a maximum vertical side of 3 1/2 feet.

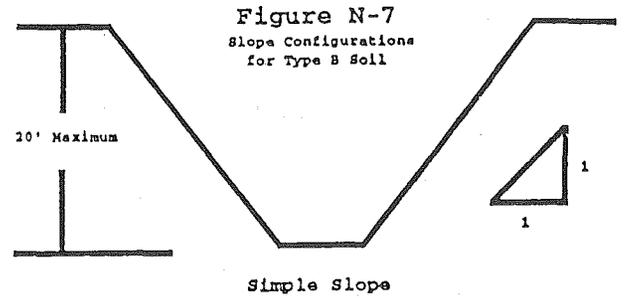


All excavations more than 8 feet but not more than 12 feet in depth with unsupported vertically sided lower portions shall have a maximum allowable slope of 1:1 and a maximum vertical side of 3 1/2 feet.

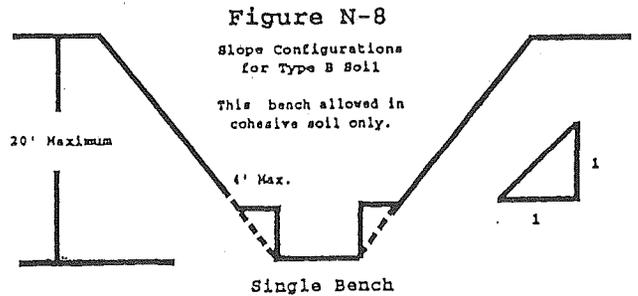


All excavations 20 feet or less in depth which have vertically sided lower portions that are supported or shielded shall have a maximum allowable slope of 3/4:1. The support or shield system must extend at least 18 inches above the top of the vertical side.

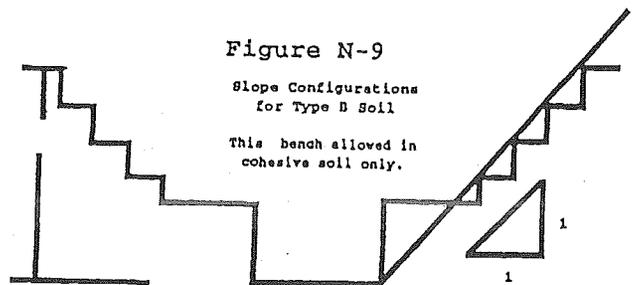
All other simple slope, compound slope, and vertically sided lower portion excavations shall be in accordance with other options permitted under WAC 296-155-037(2).



All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 1:1

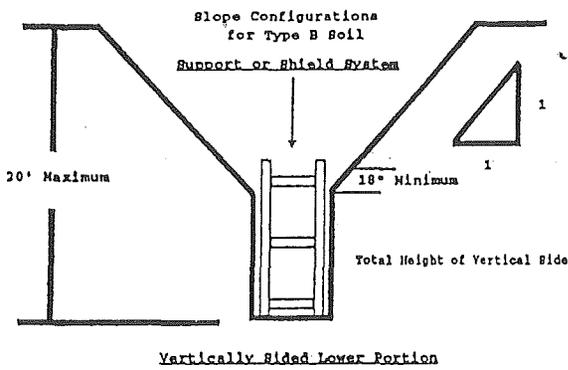


All benched excavations 20 feet or less in depth shall have a maximum allowable slope of 1:1 and maximum bench dimensions of 4 feet.



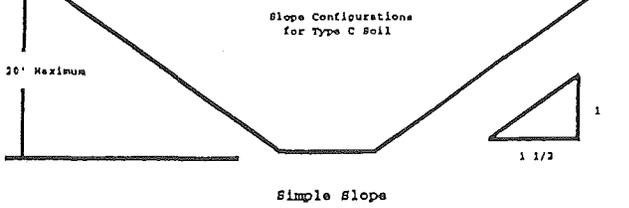
All benched excavations 20 feet or less in depth shall have a maximum allowable slope of 1:1 and maximum bench dimensions of 4 feet.

Figure N-10



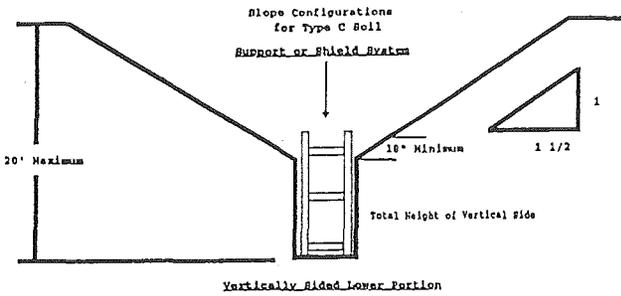
All excavations 20 feet or less in depth which have vertically sided lower portions shall be shielded or supported to a height at least 18 inches above the top of the vertical side. All such excavations shall have a maximum allowable slope of 1:1

Figure N-11



All simple slope excavations 20 feet or less in depth shall have a maximum allowable slope of 1 1/2:1

Figure N-12



All excavations 20 feet or less in depth which have vertically sided lower portions shall be shielded or supported to a height at least 18 inches above the top of the vertical side. All such excavations shall have a maximum allowable slope of 1 1/2:1

EXCAVATIONS MADE IN LAYERED SOILS

All excavations 20 feet or less in depth made in layered soils shall have a maximum allowable slope for each layer as set forth below.

Figure N-13

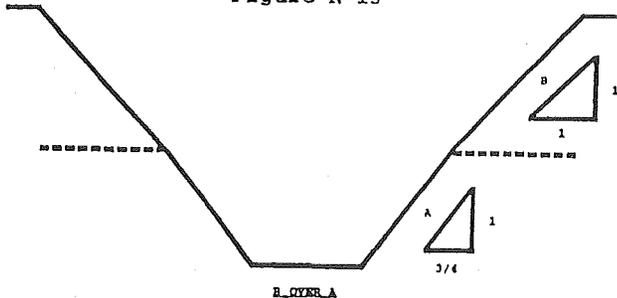


Figure N-14

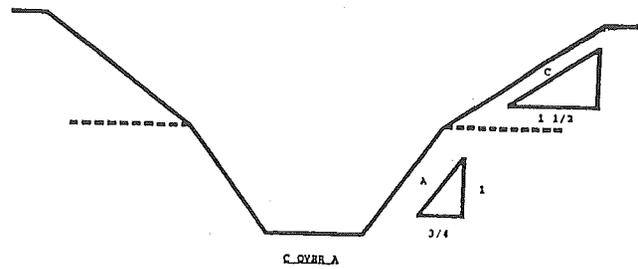


Figure N-15

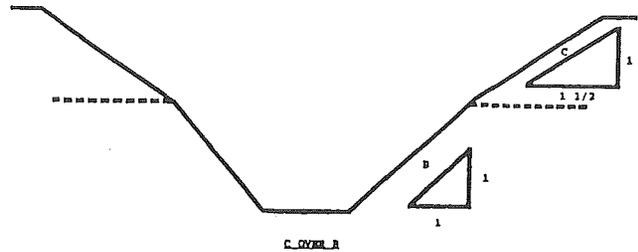


Figure N-16

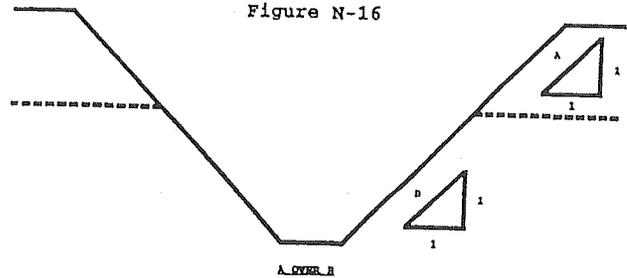
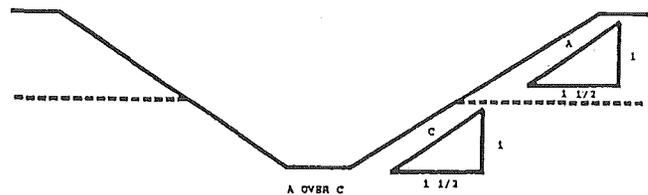
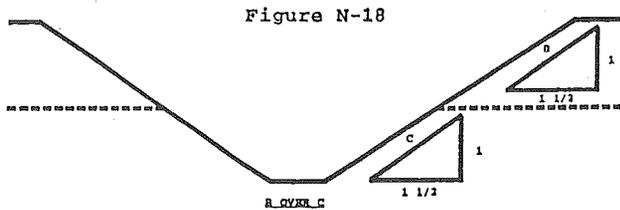


Figure N-17





[Statutory Authority: Chapter 49.17 RCW and RCW 49.17.040, [49.17].050 and [49.17].060. 92-22-067 (Order 92-06), § 296-155-66403, filed 10/30/92, effective 12/8/92.]

WAC 296-155-66405 Appendix C—Timber shoring for trenches. (1) Scope. This appendix contains information that can be used when timber shoring is provided as a method of protection from cave-ins in trenches that do not exceed 20 feet (6.1 m) in depth. This appendix must be used when design of timber shoring protective systems is to be performed in accordance with WAC 296-155-657 (3)(a). Other timber shoring configurations; other systems of support such as hydraulic and pneumatic systems; and other protective systems such as sloping, benching, shielding, and freezing systems must be designed in accordance with the requirements set forth in WAC 296-155-657 (2) and (3).

(2) Soil classification. In order to use the data presented in this appendix, the soil type or types in which the excavation is made must first be determined using the soil classification method set forth in appendix A of this part.

(3) Presentation of information. Information is presented in several forms as follows:

(a) Information is presented in tabular form in Tables N-2 through N-7 following subsection (7) of this appendix. Each table presents the minimum sizes of timber members to use in a shoring system, and each table contains data only for the particular soil type in which the excavation or portion of the excavation is made. The data are arranged to allow the user the flexibility to select from among several acceptable configurations of members based on varying the horizontal spacing of the crossbraces. Stable rock is exempt from shoring requirements and therefore, no data are presented for this condition.

(b) Information concerning the basis of the tabular data and the limitations of the data is presented in subsection (4) of this appendix, and on the tables themselves.

(c) Information explaining the use of the tabular data is presented in subsection (5) of this appendix.

(d) Information illustrating the use of the tabular data is presented in subsection (6) of this appendix.

(e) Miscellaneous notations regarding Tables N-2 through N-7 are presented in subsection (7) of this Appendix.

(4) Basis and limitations of the data.

(a) Dimensions of timber members.

(i) The sizes of the timber members listed in Tables N-2 through N-7 are taken from the National Bureau of Standards (NBS) report, "Recommended Technical Provisions for Construction Practice in Shoring and Sloping of Trenches and Excavations." In addition, where NBS did not recom-

mend specific sizes of members, member sizes are based on an analysis of the sizes required for use by existing codes and on empirical practice.

(ii) The required dimensions of the members listed in Tables N-2, N-3, and N-4 refer to actual dimensions and not nominal dimensions of the timber. Employers wanting to use nominal size shoring are directed to Tables N-5, N-6, and N-7, or have this choice under WAC 296-155-657 (3)(c), and are referred to The Corps of Engineers, The Bureau of Reclamation or data from other acceptable sources.

(b) Limitation of application.

(i) It is not intended that the timber shoring specification apply to every situation that may be experienced in the field. These data were developed to apply to the situations that are most commonly experienced in current trenching practice. Shoring systems for use in situations that are not covered by the data in this appendix must be designed as specified in WAC 296-155-657(3).

(ii) When any of the following conditions are present, the members specified in the tables are not considered adequate. Either an alternate timber shoring system must be designed or another type of protective system designed in accordance with WAC 296-155-657.

(A) When loads imposed by structures or by stored material adjacent to the trench weigh in excess of the load imposed by a two-foot soil surcharge. The term "adjacent" as used here means the area within a horizontal distance from the edge of the trench equal to the depth of the trench.

(B) When vertical loads imposed on cross braces exceed a 240-pound gravity load distributed on a one-foot section of the center of the crossbrace.

(C) When surcharge loads are present from equipment weighing in excess of 20,000 pounds.

(D) When only the lower portion of a trench is shored and the remaining portion of the trench is sloped or benched unless: The sloped portion is sloped at an angle less steep than three horizontal to one vertical; or the members are selected from the tables for use at a depth which is determined from the top of the overall trench, and not from the toe of the sloped portion.

(5) Use of Tables. The members of the shoring system that are to be selected using this information are the cross braces, the uprights, and the wales, where wales are required. Minimum sizes of members are specified for use in different types of soil. There are six tables of information, two for each soil type. The soil type must first be determined in accordance with the soil classification system described in appendix A of this Part. Using the appropriate table, the selection of the size and spacing of the members is then made. The selection is based on the depth and width of the trench where the members are to be installed and, in most instances, the selection is also based on the horizontal spacing of the crossbraces. Instances where a choice of horizontal spacing of crossbracing is available, the horizontal spacing of the crossbraces must be chosen by the user before the size of any member can be determined. When the soil type, the width and depth of the trench, and the horizontal spacing of the crossbraces are known, the size and vertical spacing of the crossbraces, the size and vertical spacing of the wales, and the size and horizontal spacing of the uprights can be read from the appropriate table.

(6) Examples to illustrate the use of Tables N-2 through N-4.

(a) Example 1.

A trench dug in Type A soil is 13 feet deep and five feet wide.

From Table N-2, for acceptable arrangements of timber can be used.

Arrangement #1

Space 4x4 crossbraces at six feet horizontally and four feet vertically.

Wales are not required.

Space 3x8 uprights at six feet horizontally. This arrangement is commonly called "skip shoring."

Arrangement #2

Space 4x6 crossbraces at eight feet horizontally and four feet vertically.

Space 8x8 wales at four feet vertically.

Space 2x6 uprights at four feet horizontally.

Arrangement #3

Space 6x6 crossbraces at 10 feet horizontally and four feet vertically.

Space 8x10 wales at four feet vertically.

Space 2x6 uprights at five feet horizontally.

Arrangement #4

Space 6x6 crossbraces at 12 feet horizontally and four feet vertically.

Space 10x10 wales at four feet vertically.

Space 3x8 uprights at six feet horizontally.

(b) Example 2.

A trench dug in Type B soil in 13 feet deep and five feet wide.

From Table N-3 three acceptable arrangements of members are listed.

Arrangement #1

Space 6x6 crossbraces at six feet horizontally and five feet vertically.

Space 8x8 wales at five feet vertically.

Space 2x6 uprights at two feet horizontally.

Arrangement #2

Space 6x8 crossbraces at eight feet horizontally and five feet vertically.

Space 10x10 wales at five feet vertically.

Space 2x6 uprights at two feet horizontally.

Arrangement #3

Space 8x8 crossbraces at 10 feet horizontally and five feet vertically.

Space 10x12 wales at five feet vertically.

Space 2x6 uprights at two feet vertically.

(c) Example 3.

A trench dug Type C soil is 13 feet deep and five feet wide.

From Table N-4 two acceptable arrangements of members can be used.

Arrangement #1

Space 8x8 crossbraces at six feet horizontally and five feet vertically.

Space 10x12 wales at five feet vertically.

Position 2x6 uprights as closely together as possible.

If water must be retained use special tongue and groove uprights to form tight sheeting.

Arrangement #2

Space 8x10 crossbraces at eight feet horizontally and five feet vertically.

Space 12x12 wales at five feet vertically.

Position 2x6 uprights in a close sheeting configuration unless water pressure must be resisted. Tight sheeting must be used where water must be retained.

(d) Example 4.

A trench dug in Type C soil is 20 feet deep and 11 feet wide. The size and spacing of members for the section of trench that is over 15 feet in depth is determined using Table N-4. Only one arrangement of members is provided.

Space 8x10 crossbraces at six feet horizontally and five feet vertically.

Space 12x12 wales at five feet vertically.

Use 3x6 tight sheeting.

Use of Tables N-5, N-6, and N-7 would follow the same procedures.

(7) Notes for all tables.

(a) Member sizes at spacings other than indicated are to be determined as specified in WAC 296-155-657(3). "Design of Protective Systems."

(b) When conditions are saturated or submerged use Tight Sheeting. Tight Sheeting refers to the use of specially-edged timber planks (e.g., tongue and groove) at least three inches thick, steel sheet piling, or similar construction that when driven or placed in position provide a tight wall to resist the lateral pressure of water and to prevent the loss of backfill material. Close Sheeting refers to the placement of planks side-by-side allowing as little space as possible between them.

(c) All spacing indicated is measured center to center.

(d) Wales to be installed with greater dimension horizontal.

(e) If the vertical distance from the center of the lowest crossbrace to the bottom of the trench exceeds two and one-half feet, uprights shall be firmly embedded or a mudsill shall be used. Where uprights are embedded, the vertical distance from the center of the lowest crossbrace to the bottom of the trench shall not exceed 36 inches. When mudsills are used, the vertical distance shall not exceed 42 inches. Mudsills are wales that are installed at the toe of the trench side.

(f) Trench jacks may be used in lieu of or in combination with timber crossbraces.

(g) Placement of crossbraces. When the vertical spacing of crossbraces is four feet, place the top crossbrace no more than two feet below the top of the trench. When the vertical spacing of crossbraces is five feet, place the top crossbrace no more than 2.5 feet below the top of the trench.

WAC 296-155-66407 Appendix D—Aluminum hydraulic shoring for trenches. (1) Scope. This appendix contains information that can be used when aluminum hydraulic shoring is provided as a method of protection against cave-ins in trenches that do not exceed 20 feet (6.1m) in depth. This appendix must be used when design of the aluminum hydraulic protective system cannot be performed in accordance with WAC 296-155-657 (3)(b).

(2) Soil Classification. In order to use data presented in this appendix, the soil type or types in which the excavation is made must first be determined using the soil classification method set forth in appendix A of this Part.

(3) Presentation of information. Information is presented in several forms as follows:

(a) Information is presented in tabular form in Tables N-8 through N-11. Each table presents the maximum vertical and horizontal spacings that may be used with various aluminum member sizes and various hydraulic cylinder sizes. Each table contains data only for the particular soil type in which the excavation or portion of the excavation is made. Tables N-8 and N-9 are for vertical shores in Types A and B soil. Tables N-10 and N-11 are for horizontal waler systems in Types B and C soil.

(b) Information concerning the basis of the tabular data and the limitations of the data is presented in subsection (4) of this appendix.

(c) Information explaining the use of the tabular data is presented in subsection (5) of this appendix.

(d) Information illustrating the use of the tabular data is presented in subsection (6) of this appendix.

(e) Miscellaneous notations (footnotes) regarding Table N-8 through N-11 are presented in subsection (7) of this appendix.

(f) Figures, illustrating typical installations of hydraulic shoring, are included just prior to the Tables. The illustrations page is entitled "Aluminum Hydraulic Shoring: Typical Installations."

(4) Basis and limitations of the data.

(a) Vertical shore rails and horizontal wales are those that meet the Section Modulus requirements in Tables N-8 through N-10. Aluminum material is 6061-T6 or material of equivalent strength and properties.

(b) Hydraulic cylinders specifications.

(i) 2-inch cylinders shall be a minimum 2-inch inside diameter with a minimum safe working capacity of no less than 18,000 pounds axial compressive load at maximum extension. Maximum extension is to include full range of cylinder extensions as recommended by product manufacturer.

(ii) 3-inch cylinders shall be a minimum 3-inch inside diameter with a safe working capacity of not less than 30,000 pounds axial compressive load at extensions as recommended by product manufacturer.

(c) Limitation of application.

(i) It is not intended that the aluminum hydraulic specification apply to every situation that may be experienced in the field. These data were developed to apply to the situations that are most commonly experienced in current trenching practice. Shoring systems for use in situations that are not covered by the data in this appendix must be

otherwise designed as specified in WAC 296-155-657(3).

(ii) When any of the following conditions are present; the members specified in the Tables are not considered adequate. In this case, an alternative aluminum hydraulic shoring system or other type of protective system must be designed in accordance with WAC 296-155-657.

(A) When vertical loads imposed on cross braces exceed a 100 Pound gravity load distributed on a one foot section of the center of the hydraulic cylinder.

(B) When surcharge loads are present from equipment weighing in excess of 20,000 pounds.

(C) When only the lower portion of a trench is shored and the remaining portion of the trench is sloped or benched unless: The slope portion is sloped at an angle less steep than three horizontal to one vertical; or the members are selected from the tables for use at a depth which is determined from the top of the overall trench, and not from the toe of the sloped portion.

(5) Use of Tables N-8 through N-11. The members of the shoring system that are to be selected using this information are the hydraulic cylinders, and either the vertical shores or the horizontal wales. When a waler system is used the vertical timber sheeting to be used is also selected from these tables. The Tables N-8 and N-9 for vertical shores are used in Type A and B soils that do not require sheeting, Type B soils that may require sheeting, and Type C soils that always require sheeting are found in the horizontal wale Tables N-10 and N-11. The soil type must first be determined in accordance with the soil classification system described in appendix A of this Part. Using the appropriate table, the selection of the size and spacing of the members is made. The selection is based on the depth and width of the trench where the members are to be installed. In these tables the vertical spacing is held constant at four feet on center. The tables show the maximum horizontal spacing of cylinders allowed for each size of wale in the waler system tables, and in the vertical shore tables, the hydraulic cylinder horizontal spacing is the same as the vertical shore spacing.

(6) Example to Illustrate the Use of the Tables:

(a) Example 1: A trench dug in Type A soil is 6 feet deep and 3 feet wide. From Table N-8: Find vertical shores and 2 inch diameter cylinders spaced 8 feet on center (o.c.) horizontally and 4 feet on center (o.c.) vertically. (See Figures N-23 & N-25 for typical installations.)

(b) Example 2: A trench is dug in Type B soil that does not require sheeting, 13 feet deep and 5 feet wide. From Table N-9: Find vertical shores and 2 inch diameter cylinders spaced 6.5 feet o.c. horizontally and 4 feet o.c. vertically. (See Figures N-23 & N-25 for typical installations.)

(c) A trench is dug in Type B soil that does not require sheeting, but does experience some minor raveling of the trench face. The trench is 16 feet deep and 9 feet wide. From Table N-9: Find vertical shores and 2 inch diameter cylinder (with special oversleeves as designated by subdivision (7)(b)) spaced 5.5 feet o.c. horizontally and 4 feet o.c. vertically, plywood (per subdivision (7)(g)) to the N-8 through N-11 Tables) should be used behind the shores. (See Figures N-24 & N-25 for typical installations.)

(d) Example 4: A trench is dug in previously disturbed Type B soil, with characteristics of a Type C soil, and will

require sheeting. The trench is 18 feet deep and 12 feet wide. 8 foot horizontal spacing between cylinders is desired for working space. From Table N-10: Find horizontal wale with a section modulus of 14.0 spaced at 4 feet o.c. vertically and 3 inch diameter cylinder spaced at 9 feet maximum o.c. horizontally, 3x12 timber sheeting is required at close spacing vertically. (See Figure N-26 for typical installation.)

(e) Example 5: A trench is dug in Type C soil, 9 feet deep and 4 feet wide. Horizontal cylinder spacing in excess of 6 feet is desired for working space. From Table N-11: Find horizontal wale with a section modulus of 7.0 and 2 inch diameter cylinders spaced at 6.5 feet o.c. horizontally. Or, find horizontal wale with a 14.0 section modulus and 3 inch diameter cylinder spaced at 10 feet o.c. horizontally. Both wales are spaced 4 feet o.c. vertically. 3x12 timber sheeting is required at close spacing vertically. (See Figure N-26 for typical installation.)

(7) Footnotes, and general notes, for Tables N-8 through N-11.

(a) For applications other than those listed in the tables, refer to WAC 296-155-657 (3)(b) for use of manufacturer's tabulated data. For trench depths in excess of 20 feet, refer to WAC 296-155-657 (3)(b) and (c).

(b) 2-inch diameter cylinders, at this width, shall have structural steel tube (3.5x3.5x0.1875) oversleeves, or structural oversleeves of manufacturer's specification, extending the full, collapsed length.

(c) Hydraulic cylinders capacities.

(i) 2-inch cylinders shall be a minimum 2-inch inside diameter with a safe working capacity of not less than 18,000 pounds axial compressive load at maximum extension. Maximum extension is to include full range of cylinder extensions as recommended by product manufacturer.

(ii) 3-inch cylinders shall be a minimum 3-inch inside diameter with a safe work capacity of not less than 30,000 pounds axial compressive load at maximum extension. Maximum extension is to include full range of cylinder extensions as recommended by product manufacturer.

(d) All spacing indicated is measured center to center.

(e) Vertical shoring rails shall have a minimum section modulus of 0.40 inch.

(f) When vertical shores are used, there must be a minimum of three shores spaced equally, horizontally, in a group.

(g) Plywood shall be 1.125 in. thick softwood or 0.75 inch thick, 14 ply, arctic white birch (Finland form). Please note that plywood is not intended as a structural member, but only for prevention of local raveling (sloughing of the trench face) between shores.

(h) See appendix C for timber specifications.

(i) Wales are calculated for simple span conditions.

(j) See subsection (4) of this appendix, for basis and limitations of the data.

ALUMINUM HYDRAULIC SHORING
TYPICAL INSTALLATIONS

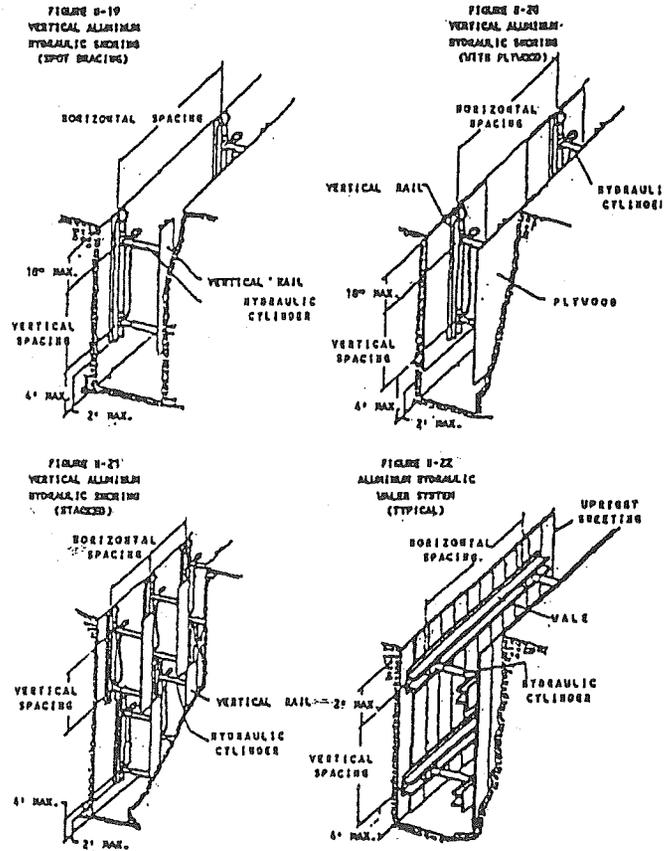


TABLE N-8
ALUMINUM HYDRAULIC SHORING
VERTICAL SHORES
FOR SOIL TYPE A

Depth of Trench (Feet)	Maximum Horizontal Spacing (Feet)	Maximum Vertical Spacing (Feet)	Hydraulic Cylinders		
			Width of Trench (Feet)		
			Up to 8	Over 8 Up to 12	Over 12 Up to 15
Over 4 Up to 10	8				
Over 10 Up to 15	8	4	2 INCH DIAMETER	3 INCH DIAMETER NOTE (2)	3 INCH DIAMETER
Over 15 Up to 20	7				
Over 20	NOTE (1)				

Footnotes to tables, and general notes on hydraulic shoring, are found in Appendix D, WAC 296-155-66407 (7)
Note (1): See Appendix D, WAC 296-155-66407 (7)(a)
Note (2): See Appendix D, WAC 296-155-66407 (7)(b)

TABLE N-9
ALUMINUM HYDRAULIC SHORING
VERTICAL SHORES
FOR SOIL TYPE B

Depth of Trench (Feet)	Maximum Horizontal Spacing (Feet)	Maximum Vertical Spacing (Feet)	Hydraulic Cylinders			
			Width of Trench (Feet)			
			Up to 8	Over 8 Up to 12	Over 12 Up to 15	
Over 4 Up to 10	8					
Over 10 Up to 15	6.5	4	2 INCH DIAMETER	2 INCH DIAMETER NOTE (2)	3 INCH DIAMETER	
Over 15 Up to 20	5.5					
Over 20	NOTE (1)					

Footnotes to tables, and general notes on hydraulic shoring, are found in Appendix D, WAC 296-155-66407(7)
 Note (1): See Appendix D, WAC 296-155-66407(7)(a)
 Note (2): See Appendix D, WAC 296-155-66407(7)(b)

[Statutory Authority: Chapter 49.17 RCW and RCW 49.17.040, [49.17].050 and [49.17].060. 92-22-067 (Order 92-06), § 296-155-66407, filed 10/30/92, effective 12/8/92.]

WAC 296-155-66409 Appendix E—Alternatives to timber shoring.

Appendix E to part N - Alternatives to Timber Shoring

Figure N-23, Aluminum Hydraulic Shoring

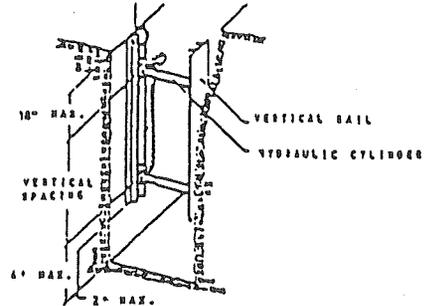


TABLE N-10
ALUMINUM HYDRAULIC SHORING
WALER SYSTEMS
FOR SOIL TYPE B

Depth of Trench (Feet)	Waler		Hydraulic Cylinders						Timber Uprights		
	Vertical Spacing (Feet)	Section Modulus (In ³)	Width of Trench (Feet)						Solid Sheet	2 Feet	3 Feet
			Up to 8		Over 8 Up to 12		Over 12 Up to 15				
Over 4 Up to 10	4	3.5	8.0	2 IN	8.0	2 IN	8.0	3 IN	---	---	3 X 12
		7.0	9.0	2 IN	9.0	2 IN	9.0	3 IN			
		14.0	12.0	3 IN	12.0	3 IN	12.0	3 IN			
Over 10 Up to 15	4	3.5	6.0	2 IN	6.0	2 IN	6.0	3 IN	---	3 X 12	---
		7.0	8.0	3 IN	8.0	3 IN	8.0	3 IN			
		14.0	10.0	3 IN	10.0	3 IN	10.0	3 IN			
Over 15 Up to 20	4	3.5	5.5	2 IN	5.5	2 IN	5.5	3 IN	3 X 12	---	---
		7.0	6.0	3 IN	6.0	3 IN	6.0	3 IN			
		14.0	9.0	3 IN	9.0	3 IN	9.0	3 IN			
Over 20	NOTE (1)										

Footnotes to tables, and general notes on hydraulic shoring, are found in Appendix D, WAC 296-155-66407(7)
 Note (1): See Appendix D, WAC 296-155-66407(7)(a)
 Note (2): See Appendix D, WAC 296-155-66407(7)(b)
 *Consult product manufacturer and/or qualified engineer for Section Modulus of available walers.

Figure N-24, Pneumatic/hydraulic Shoring

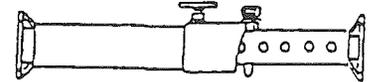
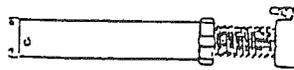


TABLE N-11
ALUMINUM HYDRAULIC SHORING
WALER SYSTEMS
FOR SOIL TYPE C

Depth of Trench (Feet)	Waler		Hydraulic Cylinders						Timber Uprights		
	Vertical Spacing (Feet)	Section Modulus (In ³)	Width of Trench (Feet)						Solid Sheet	2 Feet	3 Feet
			Up to 8		Over 8 Up to 12		Over 12 Up to 15				
Over 4 Up to 10	4	3.5	6.0	2 IN	6.0	2 IN	6.0	3 IN	3 X 12	---	---
		7.0	6.5	2 IN	6.5	2 IN	6.5	3 IN			
		14.0	10.0	3 IN	10.0	3 IN	10.0	3 IN			
Over 10 Up to 15	4	3.5	4.0	2 IN	4.0	2 IN	4.0	3 IN	3 X 12	---	---
		7.0	5.5	3 IN	5.5	3 IN	5.5	3 IN			
		14.0	8.0	3 IN	8.0	3 IN	8.0	3 IN			
Over 15 Up to 20	4	3.5	3.5	2 IN	3.5	2 IN	3.5	3 IN	3 X 12	---	---
		7.0	5.0	3 IN	5.0	3 IN	5.0	3 IN			
		14.0	6.0	3 IN	6.0	3 IN	6.0	3 IN			
Over 20	NOTE (1)										

Footnotes to tables, and general notes on hydraulic shoring, are found in Appendix D, WAC 296-155-66407(7)
 Note (1): See Appendix D, WAC 296-155-66407(7)(a)
 Note (2): See Appendix D, WAC 296-155-66407(7)(b)
 *Consult product manufacturer and/or qualified engineer for Section Modulus of available walers.

Figure N-25, Trench Jacks (Screw Jacks)

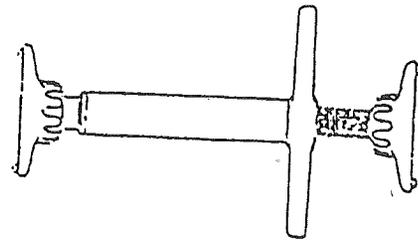
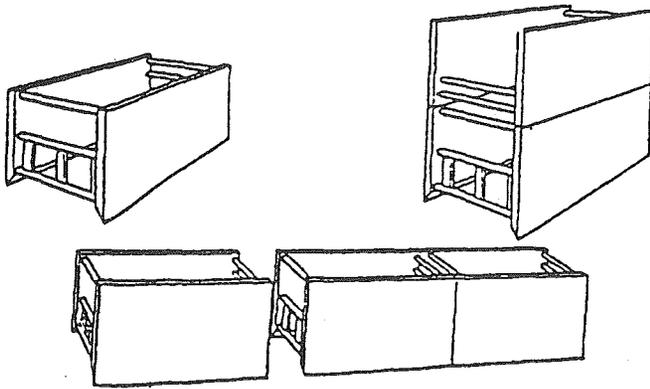


Figure N-26, Trench Shields



[Statutory Authority: Chapter 49.17 RCW and RCW 49.17.040, [49.17].050 and [49.17].060. 92-22-067 (Order 92-06), § 296-155-66409, filed 10/30/92, effective 12/8/92.]

WAC 296-155-66411 Appendix F—Selection of protective systems. The following figures are a graphic summary of the requirements contained in Part N for excavations 20 feet or less in depth. Protective systems for use in excavations more than 20 feet in depth must be designed by a registered professional engineer in accordance with WAC 296-155-657 (2) and (3).

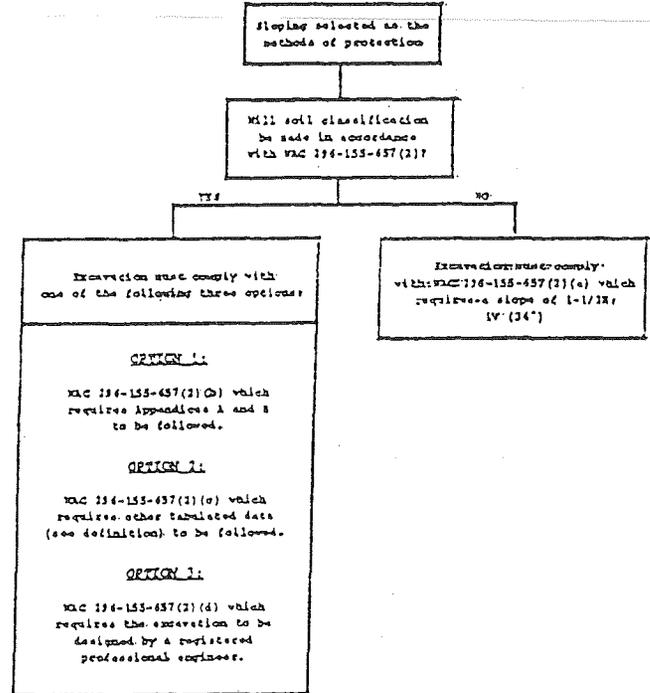


FIGURE N-28 - SLOPING OPTIONS

Appendix F to Part N -- Selection of Protective Systems

The following figures are a graphic summary of the requirements contained in Part F for excavations 10 feet or less in depth. Protective systems for use in excavations more than 10 feet in depth must be designed by a registered professional engineer in accordance with WAC 296-155-657(2) and (3).

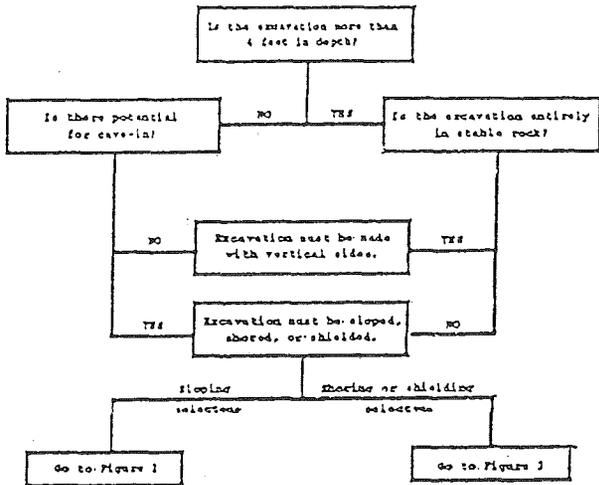


FIGURE N-27 - PRELIMINARY DECISIONS

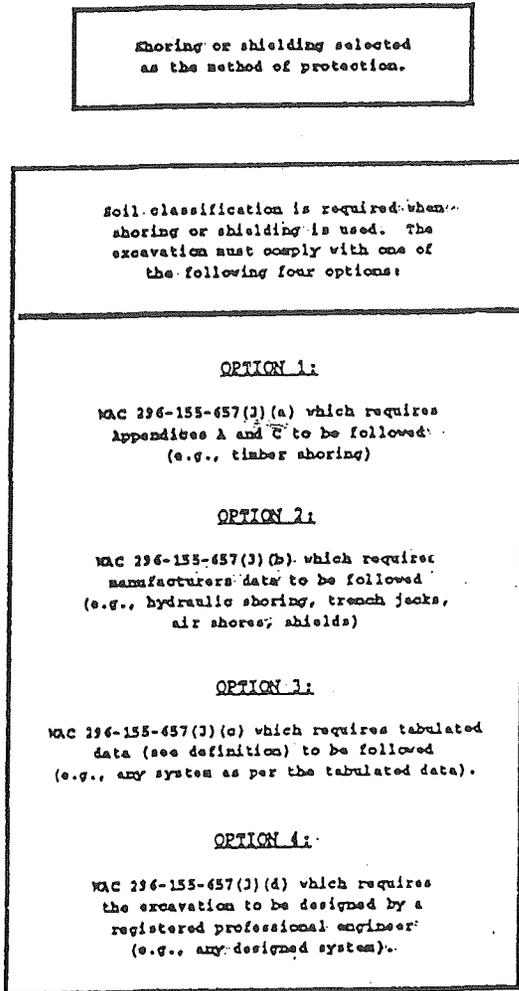


FIGURE N-29 - SHORING AND SHIELDING OPTIONS

[Statutory Authority: Chapter 49.17 RCW and RCW 49.17.040, [49.17].050 and [49.17].060. 92-22-067 (Order 92-06), § 296-155-66411, filed 10/30/92, effective 12/8/92.]

**PART O
CONCRETE, CONCRETE FORMS, SHORING, AND
MASONRY CONSTRUCTION**

WAC 296-155-675 Scope, application, and definitions applicable to this part. (1) Scope and application. This part sets forth requirements to protect all construction employees from the hazards associated with concrete and masonry construction operations performed in workplaces covered under chapter 296-155 WAC.

(2) Definitions applicable to this part.

(a) "Bull float" means a tool used to spread out and smooth the concrete.

(b) "Formwork" means the total system of support for freshly placed or partially cured concrete, including the mold or sheeting (form) that is in contact with the concrete as well

as all supporting members including shores, reshores, hardware, braces, and related hardware.

(c) "Jacking operation" means the task of lifting a slab (or group of slabs) vertically from one location to another (e.g., from the casting location to a temporary (parked) location, or from a temporary location to another temporary location, or to its final location in the structure), during the construction of a building/structure where the lift-slab process is being used.

(d) "Lift slab" means a method of concrete construction in which floor and roof slabs are cast on or at ground level and, using jacks, lifted into position.

(e) "Limited access zone" means an area alongside a masonry wall, which is under construction, and which is clearly demarcated to limit access by employees.

(f) "Precast concrete" means concrete members (such as walls, panels, slabs, columns, and beams) which have been formed, cast, and cured prior to final placement in a structure.

(g) "Reshoring" means the construction operation in which shoring equipment (also called reshores or reshoring equipment) is placed, as the original forms and shores are removed, in order to support partially cured concrete and construction loads.

(h) "Shore" means a supporting member that resists a compressive force imposed by a load.

(i) "Vertical slip forms" means forms which are jacked vertically during the placement of concrete.

(j) "Guy" means a line that steadies a high piece or structure by pulling against an off-center load.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-675, filed 7/20/94, effective 9/20/94; 91-11-070 (Order 91-01), § 296-155-675, filed 5/20/91, effective 6/20/91; 90-03-029 (Order 89-20), § 296-155-675, filed 1/11/90, effective 2/26/90; 89-11-035 (Order 89-03), § 296-155-675, filed 5/15/89, effective 6/30/89; Order 74-26, § 296-155-675, filed 5/7/74, effective 6/6/74.]

WAC 296-155-680 General provisions. (1) General. All equipment, material and construction techniques used in concrete construction and masonry work shall meet the applicable requirements for design, construction, inspection, testing, maintenance and operations as prescribed in ANSI A10.9-1970, Safety Requirements for Concrete Construction and Masonry Work.

(2) Construction loads. No construction loads shall be placed on a concrete structure or portion of a concrete structure unless the employer determines, based on information received from a person who is qualified in structural design, that the structure or portion of the structure is capable of supporting the loads.

(3) Vertical loads. Vertical loads consist of a dead load plus an allowance for live load. The weight of formwork together with the weight of freshly placed concrete is dead load. The live load consists of the weight of workers, equipment, runways and impact, and shall be computed in pounds per square foot (psf) of horizontal projection.

(4) Lateral loads. Braces and shores shall be designed to resist all foreseeable lateral loads such as wind, cable tensions, inclined supports, impact of placement, and starting and stopping of equipment. The assumed value of load due to wind, impact of concrete, and equipment acting in any direction at each floor line shall not be less than one hundred

pounds per lineal foot of floor edge or two percent of total dead load of the floor, whichever is greater. Wall forms shall be designed for a minimum wind load of ten psf, and bracing for wall forms should be designed for a lateral load of at least one hundred pounds per lineal foot of wall, applied at the top. Walls of unusual height require special consideration.

(5) Special loads. Formwork shall be designed for all special conditions of construction likely to occur, such as unsymmetrical placement of concrete, impact of machine-delivered concrete, uplift, and concentrated loads.

(6) Form supports and wedges shall be checked during concrete placement to prevent distortion or failure.

(7) Reinforcing steel.

(a) All protruding reinforcing steel, onto and into which employees could fall, shall be guarded to eliminate the hazard of impalement.

(b) Wire mesh rolls: Wire mesh rolls shall be secured at each end to prevent dangerous recoiling action.

(c) Guying: Reinforcing steel for walls, piers, columns, and similar vertical structures shall be guyed and supported to prevent overturning and to prevent collapse.

(8) Post-tensioning operations.

(a) No employee (except those essential to the post-tensioning operations) shall be permitted to be behind the jack during tensioning operations.

(b) Signs and barriers shall be erected to limit employee access to the post-tensioning area during tensioning operations.

(9) Working under loads.

(a) No employee shall be permitted to work under concrete buckets while buckets are being elevated or lowered into position.

(b) To the extent practical, elevated concrete buckets shall be routed so that no employee, or the fewest number of employees, are exposed to the hazards associated with falling concrete buckets.

(10) Personal protective equipment.

(a) No employee shall be permitted to apply a cement, sand, and water mixture through a pneumatic hose unless the employee is wearing protective head and face equipment.

(b) No employee shall be permitted to place or tie reinforcing steel more than six feet (1.8 m) above any adjacent working surface unless the employee is protected by the use of a safety belt or equivalent fall protection meeting the criteria of chapter 296-155 WAC, Part C-1.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-680, filed 7/20/94, effective 9/20/94; 90-17-051 (Order 90-10), § 296-155-680, filed 8/13/90, effective 9/24/90; 90-03-029 (Order 89-20), § 296-155-680, filed 1/11/90, effective 2/26/90; 89-11-035 (Order 89-03), § 296-155-680, filed 5/15/89, effective 6/30/89. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-680, filed 1/21/86; Order 74-26, § 296-155-680, filed 5/7/74, effective 6/6/74.]

WAC 296-155-681 Safe walking surfaces on concrete structural members. Structural members with studs, dowels, or shear connectors installed on the top side shall not be used as a walkway and/or means of access unless such studs, dowels, or shear connectors are covered with suitable material and in such a manner as to provide a walking surface at least as stable and free of hazards as the

top surface of the member would provide without attachments installed.

Note: For the purpose of this section, "stud" means all protruding metal attachments to structural members.

[Statutory Authority: Chapter 49.17 RCW. 89-11-035 (Order 89-03), § 296-155-681, filed 5/15/89, effective 6/30/89.]

WAC 296-155-682 Requirements for equipment and tools. (1) Bulk cement storage. Bulk storage bins, containers, and silos shall be equipped with the following:

(a) Conical or tapered bottoms; and

(b) Mechanical or pneumatic means of starting the flow of material.

(2) No employee shall be permitted to enter storage facilities unless the ejection system has been shut down and locked out in accordance with WAC 296-155-429.

(3) Safety belts, harnesses, lanyards, lifelines or droplines, independently attached or attended, shall be used as prescribed in chapter 296-155 WAC, Part C-1.

(4) Concrete mixers. Concrete mixers with one cubic yard (.8 m3) or larger loading skips shall be equipped with the following:

(a) A mechanical device to clear the skip of materials; and

(b) Guardrails installed on each side of the skip.

(5) Power concrete trowels. Powered and rotating type concrete troweling machines that are manually guided shall be equipped with a control switch that will automatically shut off the power whenever the hands of the operator are removed from the equipment handles.

(6) Concrete buggies. Concrete buggy handles shall not extend beyond the wheels on either side of the buggy.

Note: Installation of knuckle guards on buggy handles is recommended.

(7) Runways.

(a) Runways shall be constructed to carry the maximum contemplated load with a safety factor of four, have a smooth running surface, and be of sufficient width for two buggies to pass. Single runs to have a minimum width of forty-two inches with turnouts. Runways to have standard railings. Where motor driven concrete buggies are used, a minimum four-inches by four-inches wheel guard shall be securely fastened to outside edge of runways.

(b) All concrete buggy runways which are 12 inches or more above a work surface or floor, or ramps with more than 4 percent incline shall be considered "elevated" runways.

Exception: Small jobs utilizing only one concrete buggy, or larger jobs utilizing a "one-way traffic pattern" may be exempt from the requirements for "turnouts" or for "sufficient width for two buggies to pass."

Exemption: Runways less than 12 inches above the floor or ground which are utilized by hard-powered buggies only, may be exempt from the requirements for guardrails and wheelguards.

(8) Concrete pumping systems.

(a) The employer shall comply with the manufacturer's specifications and limitations applicable to the operation of pumpcrete or similar systems. Where manufacturer's specifications are not available, the limitations assigned to the equipment shall be based on the determinations of a

qualified engineer, competent in this field, and such determinations will be appropriately documented and recorded.

(b) Rated load capacities, and recommended operating speeds and pressures, special hazard warnings, or instructions, shall be conspicuously posted on all equipment. Instructions and warnings shall be visible to the operator while at the control station.

(c) Concrete pumping systems using discharge pipes shall be provided with pipe supports designed for one hundred percent overload.

(d) Compressed air hoses used on concrete pumping systems shall be provided with positive fail-safe joint connectors to prevent separation of sections when pressurized.

(e) No part of the concrete pumping system shall operate closer to high voltage electrical conductors than the distances specified in chapter 296-155 WAC, Part I.

(f) Hoses and/or pipes used to carry concrete under pressure shall be secured one to the other with an adequate length of at least 1/4 inch diameter chain or cable to prevent whipping in the event of an accidental separation of joints. All system safety pins shall be in place during pumping operations.

(g) The employer shall designate a competent person who shall inspect all machinery, equipment, and accessories prior to each use, and periodically during use, to make sure it is in safe operating conditions. Any deficiencies shall be repaired, or defective parts replaced before continued use.

(h) A thorough annual inspection of the equipment including nondestructive testing of all sections of the booms, by a method capable of ensuring the structural integrity of the material being tested shall be made. The inspection and testing shall be conducted by a competent person, or a government or private agency recognized by the department. A record of the test results shall be maintained by the employer, and a copy shall be available in each unit for inspection by the department.

(i) All welding shall conform to AWS B3.0-41 Standard Qualification Procedure: AWS D8.4-61 Recommended Practices of Automotive Welding Design: or AWS D10.9-69 Standard Qualification of Welding Procedures and Welders for Piping and Tubing.

(j) Booms shall not be used for operations other than that for which they are designed.

(9) Concrete buckets.

(a) Concrete buckets equipped with hydraulic or pneumatic gates shall have positive safety latches or similar safety devices installed to prevent premature or accidental dumping.

(b) Concrete buckets shall be designed to prevent concrete from hanging up on top and the sides.

(c) Riding of concrete buckets for any purpose shall be prohibited, and vibrator crews shall be kept out from under concrete buckets suspended from cranes or cableways.

(d) When discharging on a slope, the wheels of ready-mix trucks shall be blocked and the brakes set to prevent movement.

(10) Tremies. Sections of tremies and similar concrete conveyances shall be secured with wire rope (or equivalent materials in addition to the regular couplings or connections).

(11) Bull floats. Bull float handles, used where they might contact energized electrical conductors, shall be

constructed of nonconductive material or insulated with a nonconductive sheath whose electrical and mechanical characteristics provide the equivalent protection of a handle constructed of nonconductive material.

(12) Masonry saws shall be constructed, guarded, and operated in accordance with WAC 296-155-367 (1) through (4).

(13) Lockout/tagout procedures. No employee shall be permitted to perform maintenance or repair activity on equipment (such as compressors, mixers, screens, or pumps used for concrete and masonry construction activities) where the inadvertent operation of the equipment could occur and cause injury, unless all potentially hazardous energy sources have been locked out and tagged in accordance with chapter 296-155 WAC, Part I.

[Statutory Authority: Chapter 49.17 RCW. 95-10-016, § 296-155-682, filed 4/25/95, effective 10/1/95; 94-15-096 (Order 94-07), § 296-155-682, filed 7/20/94, effective 9/20/94; 91-03-044 (Order 90-18), § 296-155-682, filed 1/10/91, effective 2/12/91; 90-17-051 (Order 90-10), § 296-155-682, filed 8/13/90, effective 9/24/90; 89-11-035 (Order 89-03), § 296-155-682, filed 5/15/89, effective 6/30/89.]

WAC 296-155-683 Concrete finishing. (1) Scaffolding for use of cement finishers shall comply with all applicable subsections of WAC 296-155-485.

(2) Where grinders, chippers, and other equipment is used which creates a thrust force while working on scaffolding, such scaffold shall be securely tied to a structure or held in with weighted drop lines.

(3) Grinding and dressing operations carried on within closed rooms, stairwells, elevator shafts, etc., shall be provided with forced air ventilation.

(4) Grinding machine operators shall wear respirators whenever machines are in operation or where dust hazard exists.

(5) Eye protection shall be worn by workers engaged in grinding, chipping, or sacking concrete as required by WAC 296-155-215.

[Statutory Authority: Chapter 49.17 RCW. 89-11-035 (Order 89-03), § 296-155-683, filed 5/15/89, effective 6/30/89.]

WAC 296-155-684 Requirements for cast in place concrete. (1) General requirements for formwork.

(a) Formwork shall be designed, fabricated, erected, supported, braced, and maintained so that it will be capable of supporting without failure all vertical and lateral loads that may reasonably be anticipated to be applied to the formwork. Formwork which is designed, fabricated, erected, supported, braced, and maintained in conformance with the Appendix to this section will be deemed to meet the requirements of this subdivision.

(b) Any form, regardless of size, shall be planned in every particular and designed and constructed with an adequate factor of safety. In addition to computable loading, additional form pressures may result from impact during concrete placement, sudden lowering of temperatures retarding the set and increasing the liquid head or static pressure, vibrations of the form or concrete, uneven stressing resulting from failure or weakening of form members, or impact from concrete buckets or placing equipment. As a result, an adequate factor of safety is required to offset these unpredictable conditions.

(c) The thoroughness of planning and design shall be governed by the size, complexity, and intended use of the form. Formwork which is complex in nature or which will be subjected to unusually high concrete pressures shall be designed or approved for use by an engineer or experienced form designer.

(2) Drawings or plans, including all revisions, for the jack layout, formwork (including shoring equipment), working decks, and scaffolds, shall be available at the jobsite.

(3) Shoring and reshoring.

(a) General: Shoring installations constructed in accordance with this standard shall be designed in accordance with American National Standard Recommended Practice for Concrete Formwork, ANSI-(ACI 347-78), Formwork for Concrete ACI 318-83, or with the following publications of the Scaffolding & Shoring Institute: Recommended Standard Safety Code for Vertical Shoring, 1970; Single Post Shore Safety Rules, 1969; and Steel Frame Shoring Safety, Safety Rules, 1969.

(b) All shoring equipment shall be inspected prior to erection to determine that it is as specified in the shoring layout.

(c) A shoring layout shall be prepared or approved by a person qualified to analyze the loadings and stresses which are induced during the construction process.

(d) A copy of the shoring layout shall be available at the jobsite.

(e) The shoring layout shall include all details of the specification, including unusual conditions such as heavy beams, sloping areas, ramps, and cantilevered slabs, as well as plan and elevation views.

(f) Shoring equipment found to be damaged such that its strength is reduced to less than that required by WAC 296-155-684 (1)(a) shall not be used for shoring.

(g) Erected shoring equipment shall be inspected immediately prior to, during, and immediately after concrete placement.

(h) Upon inspection, shoring equipment that is found to be damaged or weakened shall be immediately removed and replaced.

(i) The sills for shoring shall be sound, rigid, and capable of carrying the maximum intended load without settlement or displacement.

(j) All base plates, shore heads, extension devices, and adjustment screws shall be in firm contact, and secured when necessary, with the foundation and the form.

(k) Eccentric loads on shore heads and similar members shall be prohibited unless these members have been designed for such loading.

(l) The minimum total design load for any shoring used in slab and beam structures shall be not less than one hundred pounds per square foot for the combined live and dead load regardless of slab thickness; however, the minimum allowance for live load and formwork shall be not less than twenty pounds per square foot in addition to the weight of the concrete. Additional allowance for live load shall be added for special conditions other than when placing concrete for standard-type slabs and beams. Shoring shall also be designed to resist all foreseeable lateral loads such as wind, cable tensions, inclined supports, impact of placement, and starting and stopping of equipment. The assumed value

of load due to wind, impact of concrete, and equipment acting in any direction at each floor line shall not be less than one hundred pounds per lineal foot of floor edge or two percent of total dead load of the floor, whichever is greater. (See subsection (3)(b) of this section.)

(m) When motorized carts are used, the design load shall be increased twenty-five pounds per square foot.

(4) The design stresses for form lumber and timbers shall be within the tolerance of the grade, condition, and species of lumber used.

(5) The design stresses used for form lumber and timber shall be shown on all drawings, specifications, and shoring layouts.

(6) All load-carrying timber members of scaffold framing shall be a minimum of 1500 f (stress grade) construction grade lumber. All dimensions are nominal sizes except that where rough sizes are noted, only rough or undressed lumber of the size specified shall satisfy minimum requirements.

(7) When shoring from soil, an engineer or other qualified person shall determine that the soil is adequate to support the loads which are to be placed on it.

(8) Precautions shall be taken so that weather conditions do not change the load-carrying conditions of the soil below the design minimum.

(9) When shoring from fill or when excessive earth disturbance has occurred, an engineer or other qualified person shall supervise the compaction and reworking of the disturbed area and determine that it is capable of carrying the loads which are to be imposed upon it.

(10) Suitable sills shall be used on a pan or grid dome floor or any other floor system involving voids where vertical shoring equipment could concentrate an excessive load on a thin concrete section.

(11) When temporary storage of reinforcing rods, material, or equipment on top of formwork becomes necessary, these areas shall be sufficient to meet the loads.

(12) If any deviation in the shoring plan is necessary because of field conditions, the person who prepared the shoring layout shall be consulted for approval of the actual field setup before concrete is placed.

(13) The shoring setup shall be checked to insure that all details of the layout have been met.

(14) The completed shoring setup shall be a homogeneous unit or units and shall have the specified bracing to give it lateral stability.

(15) The shoring setup shall be checked to make certain that bracing specified in the shoring layout for lateral stability is in place.

(16) All vertical shoring equipment shall be plumb. Maximum allowable deviation from the vertical is one-eighth inch in three feet. If this tolerance is exceeded, the shoring equipment shall not be used until readjusted within this limit.

(17) Upon inspection, shoring equipment that is found to be damaged or weakened shall be immediately removed and replaced.

(18) Shoring equipment shall not be released or removed until the approval of a qualified engineer has been received.

(19) Removal of shoring equipment shall be planned so that the equipment which is still in place is not overloaded.

(20) Slabs or beams which are to be reshored should be allowed to take their actual permanent deflection before final adjustment of reshoring equipment is made.

(21) While the reshoring is underway, no construction loads shall be permitted on the partially-cured concrete.

(22) The allowable load on the supporting slab shall not be exceeded when reshoring.

(23) The reshoring shall be thoroughly checked to determine that it is properly placed and that it has the load capacity to support the areas that are being reshored.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-684, filed 7/20/94, effective 9/20/94; 89-11-035 (Order 89-03), § 296-155-684, filed 5/15/89, effective 6/30/89.]

WAC 296-155-685 Tubular welded frame shoring.

(1) Metal tubular frames used for shoring shall have allowable loads based on tests conducted according to the Recommended Procedure for Compression Testing of Scaffolds and Shores, Scaffolding & Shoring Institute, 1967.

(2) Design of shoring layouts shall be based on allowable loads which were obtained using the test procedures of subsection (1) of this section and on at least a two and one-half to one safety factor.

(3) All metal frame shoring equipment shall be inspected before erection.

(4) Metal frame shoring equipment and accessories shall not be used if heavily rusted, bent, dented, rewelded, or having broken weldments or other defects.

(5) All locking devices on frames and braces shall be in good working order, coupling pins shall align the frame or panel legs, pivoted cross braces shall have their center pivot in place, and all components shall be in a condition similar to that of original manufacture.

(6) When checking the erected shoring frames with the shoring layout, the spacing between towers and cross-brace spacing shall not exceed that shown on the layout, and all locking devices shall be in the closed position.

(7) Devices for attaching the external lateral stability bracing shall be securely fastened to the legs of the shoring frames.

(8) All baseplates, shore heads, extension devices, or adjustment screws shall be in firm contact with the footing sill and the form material, and shall be snug against the legs of the frames.

(9) Eccentric loads on shore heads and similar members shall be prohibited unless the shore heads have been designed for such loading.

(10) When formwork is installed at an angle, or sloping, or when the surface shored from is sloping, the shoring shall be designed for such loading.

(11) Adjustment screws shall not be adjusted to raise formwork after the concrete is in place.

[Statutory Authority: Chapter 49.17 RCW. 89-11-035 (Order 89-03), § 296-155-685, filed 5/15/89, effective 6/30/89; Order 74-26, § 296-155-685, filed 5/7/74, effective 6/6/74.]

WAC 296-155-686 Tube and coupler shoring. (1)

Tube and coupler towers used for shoring shall have allowable loads based on tests conducted according to the Recommended Procedure for Compression Testing of Scaffolds and Shores, Scaffolding & Shoring Institute, 1967.

(2) Design of shoring layouts shall be based on working loads which were obtained using the test procedures of subsection (1) of this section and on at least a two and one-half to one safety factor.

(3) All tube and coupler components shall be inspected before being used.

(4) Tubes of shoring structures shall not be used if heavily rusted, bent, dented, or having other defects.

(5) Couplers (clamps) shall not be used if deformed, broken, or having defective or missing threads on bolts, or other defects.

(6) The material used for the couplers (clamps) shall be of a structural type such as drop-forged steel, malleable iron, or structural grade aluminum. Gray cast iron shall not be used.

(7) When checking the erected shoring towers with the shoring layout, the spacing between posts shall not exceed that shown on the layout, and all interlocking of tubular members and tightness of couplers should be checked.

(8) All baseplates, shore heads, extension devices, or adjustment screws shall be in firm contact with the footing sill and the form material, and shall be snug against the posts.

(9) Eccentric loads on shore heads and similar members shall be prohibited unless the shore heads have been designed for such loading.

(10) Special precautions shall be taken when formwork is at angles, or sloping, or when the surface shored from is sloping.

(11) Adjustment screws shall not be adjusted to raise formwork after the concrete is in place.

[Statutory Authority: Chapter 49.17 RCW. 89-11-035 (Order 89-03), § 296-155-686, filed 5/15/89, effective 6/30/89.]

WAC 296-155-687 Single post shores. (1) When checking erected single post shores with the shoring layout, the spacing between shores in either direction shall not exceed that shown on the layout, and all clamps, screws, pins, and all other components shall be in the closed or engaged position.

(2) For stability, single post shores shall be horizontally braced in both the longitudinal and transverse directions. Diagonal bracing shall also be installed. Such bracing shall be installed as the shores are being erected.

(3) Devices which attach to the external lateral stability bracing shall be securely fastened to the single post shores.

(4) All baseplates or shore heads of single post shores shall be in firm contact with the footing sill and the form material.

(5) Whenever single post shores are used in more than one tier, the layout shall be designed and inspected by a structural engineer.

(6) Eccentric loads on shore heads shall be prohibited unless the shore heads have been designed for such loading.

(7) When formwork is at an angle, or sloping, or when the surface shored from is sloping, the shoring shall be designed for such loading.

(8) Adjustment of single post shores to raise formwork shall not be made after concrete is in place.

(9) Respecting fabricated single post shores, the following shall apply:

(a) The clamp used for adjustable timber single post shores shall have working load ratings based on tests conducted according to the standard test procedures for fabricated single post shores in Recommended Procedure for Compression Testing of Scaffolds and Shores, Scaffolding & Shoring Institute, 1967, and on at least a three to one safety factor.

(b) Shoring layouts shall be made using working loads which were obtained using the test procedures of (a) of this subsection, and on at least a three to one safety factor.

(c) All fabricated single post shores shall be inspected before being used.

(d) Fabricated single post shores shall not be used if heavily rusted, bent, dented, rewelded, or having broken weldments or other defects. If they contain timber, they shall not be used if timber is split, cut, has sections removed, is rotted, or otherwise structurally damaged.

(e) All clamps, screws, pins, threads, and all other components shall be in a condition similar to that of original manufacture.

(10) Respecting adjustable timber single post shores, the following shall apply:

(a) The clamp used for adjustable timber single post shores shall have working load ratings based on tests conducted according to the standard test procedures for fabricated single post shores in Recommended Procedure for Compression Testing of Scaffolds and Shores, Scaffolding & Shoring Institute, 1967, and on at least a three to one safety factor.

(b) Timber used shall have the safety factor and allowable working load for each grade and species as recommended in the Tables for wooden columns in the Wood Structural Design Data Book, National Forest Products Association, 1970.

(c) The shoring layout shall be made using the allowable load obtained by using the test procedure for the clamp or Tables for timber referred to in (a) and (b) of this subsection.

(d) All timber and adjusting devices to be used for adjustable timber single post shores shall be inspected before erection.

(e) Timber shall not be used if it is split, cut, has sections removed, is rotted, or is otherwise structurally damaged.

(f) Adjusting devices shall not be used if heavily rusted, bent, dented, rewelded, or having broken weldments or other defects.

(g) All nails used to secure bracing on adjustable timber single post shores shall be driven home and the point of the nail bent over.

(11) Respecting timber single post shores, the following shall apply:

(a) Timber used as single post shores shall have the safety factor and allowable working load for each grade and species as recommended in the Tables for wooden columns in the Wood Structural Design Data Book, National Forest Products Association, 1970.

(b) The shoring layout shall be prepared by using working loads obtained by using the Tables referred to in (a) of this subsection.

(c) All timber to be used for single post shoring shall be inspected before erection.

(d) Timber shall not be used if it is split, cut, has sections removed, is rotted, or is otherwise structurally damaged.

(e) All nails used to secure bracing on timber single post shores shall be driven home and the point of the nail bent over.

(12) Tiered single post shores. Whenever single post shores are used one on top of another (tiered), the employer shall comply with the following specific requirements in addition to the general requirements for formwork:

(a) The design of the shoring shall be prepared by a qualified designer and the erected shoring shall be inspected by an engineer qualified in structural design.

(b) The single post shores shall be vertically aligned.

(c) The single post shores shall be spliced to prevent misalignment.

(d) The single post shores shall be adequately braced in two mutually perpendicular directions at the splice level. Each tier shall also be diagonally braced in the same two directions.

(e) Adjustment of single post shores to raise formwork shall not be made after the placement of concrete.

(f) Reshoring shall be erected, as the original forms and shores are removed, whenever the concrete is required to support loads in excess of its capacity.

[Statutory Authority: Chapter 49.17 RCW. 89-11-035 (Order 89-03), § 296-155-687, filed 5/15/89, effective 6/30/89.]

WAC 296-155-688 Vertical slip forms. (1) Slip forms shall be designed and constructed, and the form movement carried out, under the immediate supervision of a person or persons experienced in slip form design and operation. Drawings prepared by a qualified engineer, showing the jack layout, formwork, working decks, and scaffolding, shall be available at the jobsite, and followed.

(2) The steel rods or pipe on which the jacks climb or by which the forms are lifted shall be designed for this purpose. Such rods must be adequately braced where not encased in concrete.

(3) Forms shall be designed to prevent excessive distortion of the structure during the jacking operation.

(4) All vertical slip forms shall be provided with scaffolding or work platforms completely encircling the area of placement.

(5) Jacks and vertical supports shall be positioned in such a manner that the loads do not exceed the rated capacity of the jacks.

(6) The jacks or other lifting devices shall be provided with mechanical dogs or other automatic holding devices to support the slip forms whenever failure of the power supply or lifting mechanism occurs.

(7) The form structure shall be maintained within all design tolerances specified for plumbness during the jacking operation.

(8) Lifting shall proceed steadily and uniformly and shall not exceed the predetermined safe rate of lift. A jacking system, which provides precise, simultaneous movement of the entire form in small preselected increments, is recommended for large structures.

(9) Workers placing reinforcing steel shall wear a full body harness tied off by lanyards or otherwise securely fastened when working above the scaffold level.

(10) The total allowable load on slip form platforms shall be determined by the design engineer and enforced by the field supervisor.

(11) Lateral and diagonal bracing of the forms shall be provided to prevent excessive distortion of the structure during the sliding operation.

(12) While the slide is in operation, the form structure shall be maintained in line and plumb.

(13) A field supervisor experienced in slip form construction shall be present on the deck at all times.

[Statutory Authority: Chapter 49.17 RCW. 91-03-044 (Order 90-18), § 296-155-688, filed 1/10/91, effective 2/12/91; 89-11-035 (Order 89-03), § 296-155-688, filed 5/15/89, effective 6/30/89.]

WAC 296-155-689 Placing and removal of forms.

(1) When moved or raised by crane, cableway, A-frame, or similar mechanical device, forms shall be securely attached to slings having a minimum safety factor of five. Use of No. 9 tie wire, fiber rope, and similar makeshift lashing shall be prohibited.

(2) Taglines shall be used in moving panels or other large sections of forms by crane or hoist.

(3) All hoisting equipment, including hoisting cable used to raise and move forms shall have a minimum safety factor incorporated in the manufacturer's design, and the manufacturer's recommended loading shall not be exceeded. Field-fabricated or shop-fabricated hoisting equipment shall be designed or approved by a registered professional engineer, incorporating a minimum safety factor of five in its design. Panels and built-up form sections shall be equipped with metal hoisting brackets for attachment of slings.

(4) Forms intended for use where there is a free fall of over ten feet shall be equipped with adequate scaffolding and guardrails, or employees working on the forms shall be required to wear a full body harness during forming and stripping operations.

(5) Vertical forms being raised or removed in sections shall not be released until adequately braced or secured. Overhead forms shall not be released until adequately braced or secured.

(6) Workers or others at lower levels shall be protected from falling materials. Appropriate warning signs shall be erected along walkways.

(7) Forms shall not be removed until the concrete is cured. The concrete shall be adequately set in order to permit safe removal of the forms, shoring, and bracing. Engineer's specifications and local building codes shall be adhered to in determining the length of time forms should remain in place following concrete placement. In addition, tests shall be made on field-cured concrete specimens in order to insure that concrete has obtained sufficient strength to safely support the load prior to removal of forms.

[Statutory Authority: Chapter 49.17 RCW. 91-03-044 (Order 90-18), § 296-155-689, filed 1/10/91, effective 2/12/91; 89-11-035 (Order 89-03), § 296-155-689, filed 5/15/89, effective 6/30/89.]

WAC 296-155-690 Appendix to WAC 296-155-684 cast in place concrete. General requirements for formwork.

(This Appendix is nonmandatory.)

This Appendix serves as a nonmandatory guideline to assist employers in complying with the formwork requirements in WAC 296-155-684 (1)(a). Formwork which has been designed, fabricated, erected, braced, supported, and maintained in accordance with Sections 6 and 7 of the American National Standard for Construction and Demolition Operations-Concrete and Masonry Work, ANSI A10.9-1983, shall be deemed to be in compliance with the provision of WAC 296-155-684 (1)(a).

[Statutory Authority: Chapter 49.17 RCW. 90-03-029 (Order 89-20), § 296-155-690, filed 1/11/90, effective 2/26/90; 89-11-035 (Order 89-03), § 296-155-690, filed 5/15/89, effective 6/30/89. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-690, filed 1/21/86; Order 74-26, § 296-155-690, filed 5/7/74, effective 6/6/74.]

WAC 296-155-691 Precast concrete and tilt-up operations. (1) It shall be the responsibility of the contractor to use accessories which are designed to be compatible.

(2) The design capacity of all lifting devices and accessories shall be known. The devices and accessories with the appropriate capacity shall be used.

(3) Prior to pouring the panels of a tilt-up type construction job, a set of plans or job specifications, including lifting procedures, shall be drawn up.

(a) These plans shall be at the job site and made available upon request.

(b) Any changes made in the rigging procedure of a tilt-up panel or slab shall provide the same degree of safety as required by the original plans.

(c) The plans or specifications shall contain the following information:

(i) The type, size, and location of all lifting inserts.

(ii) The type, size, and location of all brace inserts or fittings for guy wires in each panel and floor or support.

(iii) The size of braces or guys to be used.

(iv) The compression strength which concrete panels must attain prior to being lifted.

(4) The following conditions shall be included in the erection process and shall be incorporated in the design plan:

(a) Braces and all associated components of the bracing system shall be designed to incorporate a safety factor of one and one-half to resist any normal stresses to which they may be subjected, including normal high wind velocity pressures for the area.

(b) Precast concrete wall units, structural framing, and tilt-up wall panels shall be adequately supported to prevent overturning and to prevent collapse until permanent connections are completed.

(c) Floor braces used to secure panel sections shall be placed at an angle of not less than forty-five degrees or more than sixty degrees from horizontal when physically possible to install in this manner.

(d) The bracing on all panel sections shall be installed in such a manner as to prevent the panel from accidentally rotating.

(e) Each panel section not secured by other means shall have a minimum of two braces. The braces shall be installed in such a manner as to evenly distribute the load or guy wires, when properly installed, may be used in lieu of stiff leg braces.

(f) If braces are attached to a panel or slab by bolts tightened into inserts installed in holes drilled in concrete, the type of inserts used and method of installation shall be such as to develop the required strength to be maintained for the bracing system.

(g) Inserts to be installed for lifting sections of tilt-up precast panels shall be designed mechanically to maintain a safety factor of three.

(h) Lifting inserts which are embedded or otherwise attached to precast concrete members, other than the tilt-up members, shall be capable of supporting at least four times the maximum intended load applied or transmitted to them.

(i) The compression strength of the concrete shall be such that when the proper type, size, and amount of inserts are installed a minimum safety factor of two will be maintained.

(j) Lifting hardware shall be capable of supporting at least five times the maximum intended load applied or transmitted to the lifting hardware.

(k) Lifting bolts or other lifting devices which have been bent, worn, or are defective shall be discarded.

(l) The upper and lower sections of telescoping type braces shall be secured by high tensile steel pins or bolts which provide adequate shear strength and which will positively secure against accidental removal.

(m) Manufactured products shall not be altered in a manner which would reduce the safe working load to less than its original value.

(n) Inserts shall be positioned so that bolts, or lifting devices, when inserted, will be perpendicular to the face on which they are placed.

(5) Design of the panels and layout of the pour shall be made in such a manner so that when picking, the top of the panel will be away from the crane. If this is not possible, the contractor shall consult with a representative of the department and the crane company involved to determine the procedure to be followed in lifting and placing in its permanent position safely. Panels shall be lifted and handled in such a manner that they will not strike the hoisting equipment, in case of failure.

(a) Physical stops shall be provided which will prevent the bottom edge of a panel being set from slipping off the edge of its supporting structure.

(b) Tilt-up panels shall not be set when there is a possibility that wind velocity would create a hazardous condition.

(c) A qualified signalperson shall be designated and shall consult with the crane operator on lifting procedures prior to making the pick. The signalperson shall be located in such a position during the pick of the panel that they can observe both the crane operator and the employees working in the immediate area.

(d) During the lifting process, workers shall keep clear of the under side of the panel.

(e) Persons not involved in the lifting process shall be kept clear of the hazardous area near where panels are being raised, moved or placed.

(f) If braces must be removed temporarily during construction, other effective means shall be provided to safely support the panel during the interim period.

(g) Each panel shall be properly braced or otherwise secured prior to removal of the hoisting equipment.

(h) Short panels or sections not otherwise supported by floor, footings, columns or other structure, shall be properly shored.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-691, filed 7/20/94, effective 9/20/94; 90-17-051 (Order 90-10), § 296-155-691, filed 8/13/90, effective 9/24/90; 89-11-035 (Order 89-03), § 296-155-691, filed 5/15/89, effective 6/30/89.]

WAC 296-155-694 Requirements for lift-slab construction operations. (1) Lift-slab operations shall be designed and planned by a registered professional engineer who has experience in lift-slab construction. Such plans and designs shall be implemented by the employer and shall include detailed instructions and sketches indicating the prescribed method of erection. These plans and designs shall also include provisions for ensuring lateral stability of the building/structure during construction.

(2) Jacks/lifting units shall be marked to indicate their rated capacity as established by the manufacturer.

(3) Jacks/lifting units shall not be loaded beyond their rated capacity as established by the manufacturer.

(4) Jacking equipment shall be capable of supporting at least two and one-half times the load being lifted during jacking operations and the equipment shall not be overloaded. For the purpose of this provision, jacking equipment includes any load bearing component which is used to carry out the lifting operation(s). Such equipment includes, but is not limited to, the following: Threaded rods, lifting attachments, lifting nuts, hook-up collars, T-caps, shearheads, columns, and footings.

(5) Jacks/lifting units shall be designed and installed so that they will neither lift nor continue to lift when they are loaded in excess of their rated capacity.

(6) Jacks/lifting units shall have a safety device installed which will cause the jacks/lifting units to support the load in any position in the event any jack/lifting unit malfunctions or losses [loses] its lifting ability.

(7) Jacking operations shall be synchronized in such a manner to ensure even and uniform lifting of the slab. During lifting, all points at which the slab is supported shall be kept within 1/2 inch of that needed to maintain the slab in a level position.

(8) If leveling is automatically controlled, a device shall be installed that will stop the operation when the 1/2 inch tolerance set forth in subsection (7) of this section is exceeded or where there is a malfunction in the jacking (lifting) system.

(9) If leveling is maintained by manual controls, such controls shall be located in a central location and attended by a competent person while lifting is in progress. In addition to meeting the definition in WAC 296-155-012(4), the competent person must be experienced in the lifting operation and with the lifting equipment being used.

(10) The maximum number of manually controlled jacks/lifting units on one slab shall be limited to a number that will permit the operator to maintain the slab level within specified tolerances of subsection (7) of this section, but in no case shall that number exceed 14.

(11) No employee, except those essential to the jacking operation, shall be permitted in the building/structure while any jacking operation is taking place unless the building/structure has been reinforced sufficiently to ensure its integ-

ity during erection. The phrase "reinforced sufficiently to ensure its integrity" used in this subsection means that a registered professional engineer, independent of the engineer who designed and planned the lifting operation, has determined from the plans that if there is a loss of support at any jack location, that loss will be confined to that location and the structure as a whole will remain stable.

(a) Under no circumstances, shall any employee who is not essential to the jacking operation be permitted immediately beneath a slab while it is being lifted.

(b) For the purpose of subsection (11) of this section, a jacking operation begins when a slab or group of slabs is lifted and ends when such slabs are secured (with either temporary connections or permanent connections).

(c) Employers who comply with Appendix A to WAC 296-155-694 shall be considered to be in compliance with the provisions of subsections (11) through (11)(c) of this section.

(12) When making temporary connections to support slabs, wedges shall be secured by tack welding, or an equivalent method of securing the wedges to prevent them from falling out of position. Lifting rods may not be released until the wedges at that column have been secured.

(13) All welding on temporary and permanent connections shall be performed by a certified welder, familiar with the welding requirements specified in the plans and specifications for the lift-slab operation.

(14) Load transfer from jack/lifting units to building columns shall not be executed until the welds on the column shear plates (weld blocks) are cooled to air temperature.

(15) Jacks/lifting units shall be positively secured to building columns so that they do not become dislodged or dislocated.

(16) Equipment shall be designed and installed so that the lifting rods cannot slip out of position or the employer shall institute other measures, such as the use of locking or blocking devices, which will provide positive connection between the lifting rods and attachments and will prevent components from disengaging during lifting operations.

Appendix to WAC 296-155-694—Lift-slab operations
(This appendix is nonmandatory.)

In WAC 296-155-694(11), WISHA requires employees to be removed from the building/structure during jacking operations unless an independent registered professional engineer, other than the engineer who designed and planned the lifting operation, has determined that the building/structure has been sufficiently reinforced to insure the integrity of the building/structure. One method to comply with this provision is for the employer to ensure that continuous bottom steel is provided in every slab and in both directions through every wall or column head area. (Column head area means the distance between lines that are one and one half times the thickness of the slab or drop panel. These lines are located outside opposite faces of the outer edges of the shearhead sections—See Figure 1.) The amount of bottom steel shall be established by assuming loss of support at a given lifting jack and then determining the steel necessary to carry, by catenary action over the span between surrounding supports, the slab service dead load plus any service dead and live loads likely to be acting on the slab during jacking. In addition, the surrounding supports must be capable of resisting any additional load transferred to

them as a result of the loss of support at the lifting jack considered.

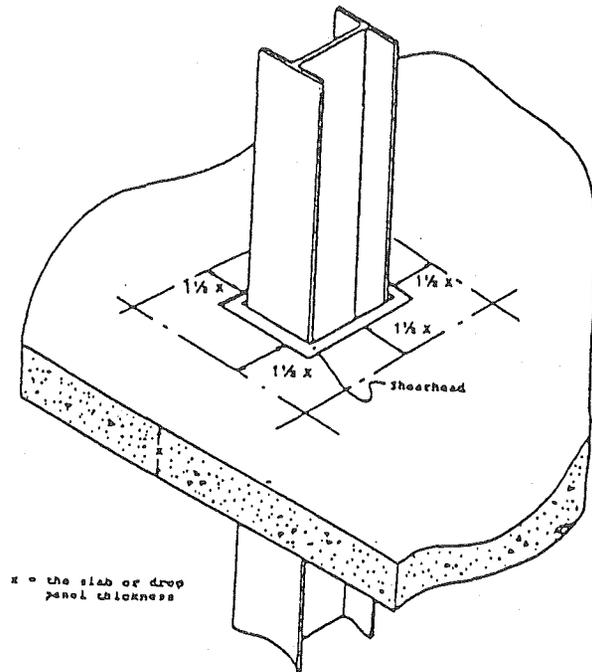


Figure 1—Column Head Area

[Statutory Authority: Chapter 49.17 RCW and RCW 49.17.040, [49.17].050 and [49.17].060. 92-22-067 (Order 92-06), § 296-155-694, filed 10/30/92, effective 12/8/92. Statutory Authority: Chapter 49.17 RCW. 91-11-070 (Order 91-01), § 296-155-694, filed 5/20/91, effective 6/20/91; 90-03-029 (Order 89-20), § 296-155-694, filed 1/11/90, effective 2/26/90; 89-11-035 (Order 89-03), § 296-155-694, filed 5/15/89, effective 6/30/89.]

WAC 296-155-695 Miscellaneous concrete construction. (1) General provisions.

(a) Deadheads used in post tensioning of tendons shall be the type that will increase the grip on the cable as the tension is increased.

(b) Proper means and equipment shall be used to prevent the over-tensioning of the tendons.

(c) Only qualified workers shall perform this type work.

(2) Prestressed and poststressed concrete operations.

(a) Anchor fitting. In utilizing anchor fittings for tensioned strands, the recommendations and instructions of the supplier concerning installation, maintenance, and replacement shall be followed.

(b) Tools and strand vices shall be kept clean and in good repair.

(c) Safety factor.

(i) Expendable strand deflection devices used to pretension concrete members shall have a minimum safety factor of two.

(ii) Reusable strand deflection devices shall have a minimum safety factor of three.

(d) Jacking operations.

(i) During jacking operations of any tensioning element or group of tensioning elements, the anchors shall be kept turned up close to the anchorplate.

(ii) No one shall be permitted to stand in line or directly over the jacking equipment during tensioning operations.

(iii) Employees shall not stand behind the jack during tensioning operations.

(e) Jacking and pulling equipment. Pulling headers, bolts, and hydraulic rams shall be frequently inspected for indication of fatigue, and the threads on bolts and nuts inspected for diminishing cross section.

(f) Storage. Stressed members shall be stored on a level base and adequately supported during storage and transportation to prevent tipping.

(g) Rigging.

(i) Stressed members shall be handled at pick points specifically designated on the manufacturer's drawings.

(ii) Stressed members shall be lifted with lifting devices recommended by the manufacturer or the engineer in charge.

(iii) No one shall be allowed under stressed members during lifting and erection.

[Statutory Authority: Chapter 49.17 RCW. 89-11-035 (Order 89-03), § 296-155-695, filed 5/15/89, effective 6/30/89. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-695, filed 1/21/86; Order 74-26, § 296-155-695, filed 5/7/74, effective 6/6/74.]

WAC 296-155-697 Requirements for masonry construction. (1) A limited access zone shall be established whenever a masonry wall is being constructed. The limited access zone shall conform to the following:

(2) The limited access zone shall be established prior to the start of construction of the wall.

(3) The limited access zone shall be equal to the height of the wall to be constructed plus four feet, and shall run the entire length of the wall.

(4) The limited access zone shall be established on the side of the wall which will be unscaffolded.

(5) The limited access zone shall be restricted to entry by employees actively engaged in constructing the wall. No other employees shall be permitted to enter the zone.

(6) The limited access zone shall remain in place until the wall is adequately supported to prevent overturning and to prevent collapse unless the height of wall is over eight feet, in which case, the limited access zone shall remain in place until the requirements of subsection (7) of this section have been met.

(7) All masonry walls over eight feet in height shall be adequately braced to prevent overturning and to prevent collapse unless the wall is adequately supported so that it will not overturn or collapse. The bracing shall remain in place until permanent supporting elements of the structure are in place.

(8) Employees engaged in cutting or chipping shall wear suitable eye protection in accordance with WAC 296-155-215.

(9) Masonry saws shall be constructed, guarded and operated in accordance with WAC 296-155-367 (1) through (4).

(10) Persons charged with operation of derricks used for stone setting shall be qualified in that type of work.

(11) Stone shall be set directly on the wall by the derrick.

(12) Breast derricks when used in setting stone shall be secured against a slip or kick back and guyed with wire

cables. Provide hold down line to prevent derrick from falling back.

(13) Stone cutters shall wear goggles while trimming stone or cutting holes.

(14) Pins shall be tested for security before stone is hoisted.

(15) Hoisting cables shall be protected from chafing and wearing over corners.

(16) Mason's mortar mixers shall have a bar-type grill installed over the mixer opening. The guard shall be installed with an automatic disconnect switch to stop the mixer tub rotation and prevent the mixer from starting whenever the guard is not in place.

[Statutory Authority: Chapter 49.17 RCW. 90-17-051 (Order 90-10), § 296-155-697, filed 8/13/90, effective 9/24/90; 90-03-029 (Order 89-20), § 296-155-697, filed 1/11/90, effective 2/26/90; 89-11-035 (Order 89-03), § 296-155-697, filed 5/15/89, effective 6/30/89.]

WAC 296-155-699 Appendix A to Part O—References to Part O of chapter 296-155 WAC. (This Appendix is nonmandatory.)

The following nonmandatory references provide information which can be helpful in understanding and complying with the requirements contained in Part O.

● Accident Prevention Manual for Industrial Operations; Eighth Edition; National Safety Council.

● Building Code Requirements for Reinforced Concrete (ACI 318-83).

● Formwork for Concrete (ACI SP-4).

● Recommended Practice for Concrete Formwork (ACI 347-78).

● Safety Requirements for Concrete and Masonry Work (ANSI A10.9-1983).

● Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens (ASTM C39-86).

● Standard Test Method for Making and Curing Concrete Test Specimens in the Field (ASTM C31-85).

● Standard Test Method for Penetration Resistance of Hardened Concrete (ASTM C803-82).

● Standard Test Method for Compressive Strength of Concrete Cylinders Cast In-Place in Cylindrical Molds (ASTM C873-85).

● Standard Method for Developing Early Age Compressive Test Values and Projecting Later Age Strengths (ASTM C918-80).

● Recommended Practice for Inspection and Testing Agencies for Concrete, Steel and Bituminous Materials as Used in Construction (ASTM E329-77).

● Method of Making and Curing Concrete Test Specimens in the Laboratory (ASTM C192-88).

● Methods of Obtaining and Testing Drilled Cores and Sawed Beams of Concrete (ASTM C42-87).

● Methods of Securing, Preparing and Testing Specimens from Hardened Lightweight Insulating Concrete for Compressive Strength (ASTM C513-86).

● Test Method for Comprehensive Strength of Lightweight Insulating Concrete (ASTM C495-86).

● Method of Making, Accelerating Curing, and Testing of Concrete Compression Test Specimens (ASTM C684-81).

● Test Method for Compressive Strength of Concrete Using Portions of Beams Broken in Flexure (ASTM C116-68 (1980)).

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-699, filed 7/20/94, effective 9/20/94; 89-11-035 (Order 89-03), § 296-155-699, filed 5/15/89, effective 6/30/89.]

PART P STEEL ERECTION

WAC 296-155-700 General requirements. (1)

Erection gangs on structural steel erection shall work under the direction of experienced crew leader.

(2) Workers shall not ride on steel being hoisted, nor slide down ropes, columns or ladders.

(3) Wire rope slings shall be used when lifting loads. Care shall be taken to avoid sharp bends by using wood or similar type padding between wire rope and load. Reinforcing steel shall not be lifted by bundling ties.

(4) If float scaffolds are used during steel erection, they shall be used in accordance with WAC 296-155-485(24).

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-700, filed 7/20/94, effective 9/20/94; 91-03-044 (Order 90-18), § 296-155-700, filed 1/10/91, effective 2/12/91. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-700, filed 1/21/86; Order 76-29, § 296-155-700, filed 9/30/76; Order 74-26, § 296-155-700, filed 5/7/74, effective 6/6/74.]

WAC 296-155-705 Flooring requirements. (1)

Permanent flooring—Skeleton steel construction in tiered buildings.

(a) The permanent floors shall be installed as the erection of structural members progresses, and there shall be not more than eight stories between the erection floor and the uppermost permanent floor, except where the structural integrity is maintained as a result of the design.

(b) At no time shall there be more than four floors or 48 feet of unfinished bolting or welding above the foundation or uppermost permanently secured floor.

(2) Temporary flooring—Skeleton steel construction in tiered buildings.

(a)(i) The derrick or erection floor shall be solidly planked or decked over its entire surface except for access openings. Planking or decking of equivalent strength, shall be of proper thickness to carry the working load. Planking shall be not less than 2 inches thick full size undressed, and shall be laid tight and secured to prevent movement.

(ii) On buildings or structures not adaptable to temporary floors, and where scaffolds are not used, safety nets shall be installed and maintained whenever the potential fall distance exceeds 10 feet. The nets shall be hung with sufficient clearance to prevent contacts with the surface of structures below.

(iii) Floor periphery - safety railing. A standard railing including midrail of 1/2-inch wire rope or equivalent shall be installed at the periphery (including all floor openings) of all temporary-planked or temporary metal-decked floors of tier buildings and other multi-floored structures during structural steel assembly.

(b)(i) Where skeleton steel erection is being done, a tightly planked and substantial floor shall be maintained within two stories or twenty-five feet, whichever is less, below and directly under that portion of each tier of beams on which any work is being performed, except when gathering and stacking temporary floor planks on a lower

floor, in preparation for transferring such planks for use on an upper floor. Where such a floor is not practicable, subsection (2)(a)(ii) of this section applies.

(ii) When gathering and stacking temporary floor planks, the planks shall be removed successively, working toward the last panel of the temporary floor so that the work is always done from the planked floor.

(3) Flooring - other construction.

(a) In the erection of a building having double wood floor construction, the rough flooring shall be completed as the building progresses, including the tier below the one on which floor joists are being installed.

(b) For single wood floor or other flooring systems, the floor immediately below the story where the floor joists are being installed shall be kept planked or decked over.

[Statutory Authority: Chapter 49.17 RCW. 91-03-044 (Order 90-18), § 296-155-705, filed 1/10/91, effective 2/12/91. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-705, filed 1/21/86; Order 76-29, § 296-155-705, filed 9/30/76; Order 74-26, § 296-155-705, filed 5/7/74, effective 6/6/74.]

WAC 296-155-710 Structural steel assembly. (1)

During the final placing of solid web structural members, the load shall not be released from the hoisting line until the members are secured with not less than two bolts, or the equivalent at each connection and drawn up wrench tight.

(2) Open web steel joists shall not be placed on any structural steel framework unless such framework is safely bolted or welded.

(3)(a) In steel framing, where bar joists are utilized, and columns are not framed in at least two directions with structural steel members, a bar joist shall be field-bolted at columns to provide lateral stability during construction.

(b) Where longspan joists or trusses, 40 feet or longer, are used, a center row of bolted bridging shall be installed to provide lateral stability during construction prior to slackening of hoisting line.

(c) No load shall be placed on open web steel joists until these security requirements are met.

(4) Tag lines shall be used for controlling loads.

[Order 74-26, § 296-155-710, filed 5/7/74, effective 6/6/74.]

WAC 296-155-715 Bolting, riveting, fitting-up, and plumbing-up. (1) General requirements.

(a) Containers shall be provided for storing or carrying rivets, bolts, and drift pins, and secured against accidental displacement when aloft.

(b) Pneumatic hand tools shall be disconnected from the power source, and pressure in hose lines shall be released, before any adjustments or repairs are made.

(c) Air line hose sections shall be tied together except when quick disconnect couplers are used to join sections.

(d) Eye protection shall be provided in accordance with Part C of this chapter.

(2) Bolting.

(a) When bolts or drift pins are being knocked out, means shall be provided to keep them from falling.

(b) Impact wrenches shall be provided with a locking device for retaining the socket.

(3) Riveting.

(a) Riveting shall not be done in the vicinity of combustible material unless precautions are taken to prevent fire.

(b) When workers are below and rivet heads are knocked off or backed out, means shall be provided to keep the rivet heads from falling on such workers.

(c) A safety wire shall be properly installed on the snap and on the handle of the pneumatic riveting hammer and shall be used at all times. The wire size shall be not less than No. 9 (B & S gauge), leaving the handle and annealed No. 14 on the snap or equivalent.

(d) The rivet heating equipment shall be kept as near as possible to the riveting gang with whom the rivet heater is working.

(e) Hot rivets shall never be thrown across shaftways or towards the outside of a building.

(f) When riveting is done on an outside wall, the rivets shall be passed by hand or thrown parallel to the wall.

(g) Metal cone shaped buckets shall be used for catching hot rivets.

(h) Riveters shall avoid allowing the air hose to become wrapped or tangled around their legs.

(i) Empty bolt and rivet kegs shall be removed from the floor as soon as possible.

(j) Pails and hand lines shall be used when raising or lowering bolts, rivets or small tools.

(k) The nozzle of the riveting gun shall be periodically inspected and the wire attachment not allowed to become worn so as to permit the nozzle to fly out with the air pressure.

(l) Electric welding equipment shall not be used where wire rope is used to suspend scaffolds.

(4) Plumbing-up.

(a) Connections of the equipment used in plumbing-up shall be properly secured.

(b) The turnbuckles shall be secured to prevent unwinding while under stress.

(c) Plumbing-up guys related equipment shall be placed so that employees can get at the connection points.

(d) Plumbing-up guys shall be removed only under the supervision of a competent person.

(5) Wood planking shall be of proper thickness to carry the working load, but shall be not less than 2 inches thick full size undressed, exterior grade plywood, at least 3/4-inch thick, or equivalent material.

(6) Metal decking of sufficient strength shall be laid tight and secured to prevent movement.

(7) Planks shall overlap the bearing on each end by a minimum of 12 inches.

(8) Wire mesh, exterior plywood, or equivalent, shall be used around columns where planks do not fit tightly.

(9) Provisions shall be made to secure temporary flooring against displacement.

(10) All unused openings in floors, temporary or permanent, shall be completely planked over or guarded in accordance with Part K of this chapter.

(11) Temporary bracing and/or guying shall be utilized to stabilize a structure until construction has been completed.

(12) Employees shall use safety belts in accordance with Part C-1 of this chapter when they are working on float scaffolds.

Chapter 49.17 RCW. 95-10-016, § 296-155-715, filed 4/25/95, effective 10/1/95; 94-15-096 (Order 94-07), § 296-155-715, filed 7/20/94, effective 9/20/94; Order 76-29, § 296-155-715, filed 9/30/76; Order 74-26, § 296-155-715, filed 5/7/74, effective 6/6/74.]

WAC 296-155-720 Safe walking surfaces on structural members. Structural members with studs, dowels or shear connectors installed on the top side shall not be used as a walkway and/or means of access unless such studs, dowels or shear connectors are covered with suitable material and in such a manner as to provide a walking surface at least as stable and free of hazards as the top surface of the member would provide without attachments installed. For the purpose of this section, "stud," shall mean all protruding metal attachments to structural members.

[Statutory Authority: Chapter 49.17 RCW. 91-03-044 (Order 90-18), § 296-155-720, filed 1/10/91, effective 2/12/91. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-720, filed 1/21/86; Order 74-26, § 296-155-720, filed 5/7/74, effective 6/6/74.]

PART Q

UNDERGROUND CONSTRUCTION

WAC 296-155-725 Definitions applicable to this part. (1) "Acceptable" means any device, equipment, or appliance that is either approved by MSHA and maintained in permissible condition, or is listed or labeled for the class and location under Part I of this chapter.

(2) "Bulkhead" means an airtight structure separating the working chamber from free air or from another chamber under a lesser pressure than the working pressure.

(3) "Caisson" means a wood, steel, concrete or reinforced concrete, air- and water-tight chamber in which it is possible for persons to work under air pressure greater than atmospheric pressure to excavate material below water level.

(4) "Cofferdam" means a watertight barricade or enclosure erected, sunk, driven or otherwise fabricated to permit the performance of work where hydrostatic pressure exists.

(5) "Decanting" means a method used for decompressing under emergency circumstances. In this procedure, the employees are brought to atmospheric pressure with a very high gas tension in the tissues and then immediately recompressed in a second and separate chamber or lock.

(6) "Emergency locks" means a lock designed to hold and permit the quick passage of an entire shift of employees.

(7) "High air" means air pressure used to supply power to pneumatic tools and devices.

(8) "Low air" means air supplied to pressurize working chambers and locks.

(9) "Man lock" means a chamber through which persons pass from one air pressure environment into another.

(10) "Materials lock" means a chamber through which materials and equipment pass from one air pressure environment into another.

(11) "Medical lock" means a special chamber in which employees are treated for decompression illness. It may also be used in pre-employment physical examinations to determine the adaptability of the prospective employee to changes in pressure.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-24-051, § 296-155-715, filed 11/27/96, effective 2/1/97. Statutory Authority:

[Title 296 WAC—page 2202]

(1997 Ed.)

(12) "Rapid excavation machine" means tunnel boring machines, shields, roadheaders, or any other similar excavation machine.

(13) "Normal condition" means one during which exposure to compressed air is limited to a single continuous working period followed by a single decompression in any given 24-hour period; the total time of exposure to compressed air during the single continuous working period is not interrupted by exposure to normal atmospheric pressure, and a second exposure to compressed air does not occur until at least 12 consecutive hours of exposure to normal atmospheric pressure has elapsed since the employee has been under pressure.

(14) "Pressure" means a force acting on a unit area. Usually shown as pounds per square inch. (p.s.i.)

(15) "Absolute pressure" (p.s.i.a.) means the sum of the atmospheric pressure and gauge pressure (p.s.i.g.)

(16) "Atmospheric pressure" means the pressure of air at sea level, usually 14.7 p.s.i.a. (1 atmosphere), or 0 p.s.i.g.

(17) "Gauge pressure" (p.s.i.g.) means pressure measured by a gauge and indicating the pressure exceeding atmospheric.

(18) "Safety screen" means an air- and water-tight diaphragm placed across the upper part of a compressed air tunnel between the face and bulkhead, in order to prevent flooding the crown of the tunnel between the safety screen and the bulkhead, thus providing a safe means of refuge and exit from a flooding or flooded tunnel.

(19) "Special decompression chamber" means a chamber to provide greater comfort for employees when the total decompression time exceeds 75 minutes.

(20) "Working chamber" means the space or compartment under air pressure in which the work is being done.

(21) "C.F.R." means Code of Federal Regulations.

(22) "MSHA" means Mine Safety and Health Administration.

(23) "NIOSH" means National Institute for Occupational Safety and Health.

[Statutory Authority: Chapter 49.17 RCW. 90-03-029 (Order 89-20), § 296-155-725, filed 1/11/90, effective 2/26/90. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-725, filed 1/21/86; Order 74-26, § 296-155-725, filed 5/7/74, effective 6/6/74.]

WAC 296-155-730 Tunnels and shafts. (1) Scope and application.

(a) This section applies to the construction of underground tunnels, shafts, chambers, and passageways. This section also applies to cut-and-cover excavations which are both physically connected to ongoing underground construction operations within the scope of this section, and covered in such a manner as to create conditions characteristic of underground construction.

(b) This section does not apply to excavation and trenching operations covered by Part N of this chapter, such as foundation operations for above-ground structures that are not physically connected to underground construction operations, and surface excavation.

(c) The employer shall comply with the requirements of this part and chapter in addition to applicable requirements of chapter 296-36 WAC, Safety standards—Compressed air work.

(2) Access and egress.

(a) Each operation shall have a check-in/check-out system that will provide positive identification of every employee underground. An accurate record of identification and location of the employees shall be kept on the surface. This procedure is not required when the construction of underground facilities designed for human occupancy has been sufficiently completed so that the permanent environmental controls are effective, and when the remaining construction activity will not cause any environmental hazard, or structural failure within the facilities.

(b) The employer shall provide and maintain safe means of access and egress to all work stations.

(c) The employer shall provide access and egress in such a manner that employees are protected from being struck by excavators, haulage machines, trains, and other mobile equipment.

(d) The employer shall control access to all openings to prevent unauthorized entry underground. Unused chutes, manways, or other openings shall be tightly covered, bulkheaded, or fenced off, and shall be posted with warning signs indicating "keep out" or similar language. Completed or unused sections of the underground facility shall be barricaded.

(3) Safety instruction. All employees shall be instructed in the recognition and avoidance of hazards associated with underground construction activities including, where appropriate, the following subjects:

(a) Air monitoring;

(b) Ventilation;

(c) Confined space entry procedures;

(d) Permit-required confined space entry procedures;

(e) Illumination;

(f) Communications;

(g) Flood control;

(h) Mechanical equipment;

(i) Personal protective equipment;

(j) Explosives;

(k) Fire prevention and protection; and

(l) Emergency procedures, including evacuation plans and check-in/check-out systems.

(4) Notification.

(a) Oncoming shifts shall be informed of any hazardous occurrences or conditions that have affected, or might affect employee safety, including liberation of gas, equipment failures, earth or rock slides, cave-ins, floodings, fire(s), or explosions.

(b) Information specified in (a) of this subsection shall be recorded in a shift journal which shall be current prior to the end of each shift, and shall be located aboveground.

(c) Oncoming supervisory personnel shall read the notification prior to going underground, and shall signify their understanding of the contents by affixing their respective initials to the log.

(d) The hazard notification log shall be retained on the site until the completion of the project.

(e) The employer shall establish and maintain direct communications for coordination of activities with other employers whose operations at the jobsite affect or may affect the safety of employees underground.

(5) Communications.

(a) When natural unassisted voice communication is ineffective, a power-assisted means of voice communication

shall be used to provide communication between the work face, the bottom of the shaft, and the surface.

(b) Two effective means of communication, at least one of which shall be voice communication, shall be provided in all shafts which are being developed or used either for personnel access or for hoisting. Additional requirements for hoist operator communication are contained in subsection (22)(c)(xv) of this section.

(c) Powered communication systems shall operate on an independent power supply, and shall be installed so that the use of or disruption of any one phone or signal location will not disrupt the operation of the system from any other location.

(d) Communication systems shall be tested upon initial entry of each shift to the underground, and as often as necessary at later times, to ensure that they are in working order.

(e) Any employee working alone underground in a hazardous location, who is both out of the range of natural unassisted voice communication and not under observation by other persons, shall be provided with an effective means of obtaining assistance in an emergency.

(6) Emergency provisions. Hoisting capability. When a shaft is used as a means of egress, the employer shall make advance arrangements for power-assisted hoisting capability to be readily available in an emergency, unless the regular hoisting means can continue to function in the event of an electrical power failure at the jobsite. Such hoisting means shall be designed so that the load hoist drum is powered in both directions of rotation and so that the brake is automatically applied upon power release or failure.

(7) Self-rescuers. The employer shall provide self-rescuers having current approval from the National Institute for Occupational Safety and Health and the Mine Safety and Health Administration to be immediately available to all employees at work stations in underground areas where employees might be trapped by smoke or gas. The selection, issuance, use, and care of respirators shall be in accordance with the requirements of chapter 296-62 WAC, Part E.

(8) Designated person. At least one designated person shall be on duty aboveground whenever any employee is working underground. This designated person shall be responsible for securing immediate aid and keeping an accurate record of the number, identification, and location of employees who are underground in case of emergency. The designated person must not be so busy with other responsibilities that the personnel counting and identification function is encumbered.

(9) Emergency lighting. Each employee underground shall have an acceptable portable hand lamp or cap lamp in his or her work area for emergency use, unless natural light or an emergency lighting system provides adequate illumination for escape.

(10) Rescue teams.

(a) On jobsites where 25 or more employees work underground at one time, the employer shall provide (or make arrangements in advance with locally available rescue services to provide) at least two 5-person rescue teams, one on the jobsite or within one-half hour travel time from the entry point, and the other within 2 hours travel time.

(b) On jobsites where less than 25 employees work underground at one time, the employer shall provide (or

make arrangements in advance with locally available rescue services to provide) at least one 5-person rescue team to be either on the jobsite or within one-half hour travel time from the entry point.

(c) Rescue team members shall be qualified in rescue procedures, the use and limitations of breathing apparatus, and the use of fire fighting equipment. Qualifications shall be reviewed not less than annually.

(d) On jobsites where flammable or noxious gases are encountered or anticipated in hazardous quantities, rescue team members shall practice donning and using pressure demand mode, self-contained breathing apparatuses monthly.

(e) The employer shall ensure that rescue teams are familiar with conditions at the jobsite.

(11) Hazardous classifications.

(a) Potentially gassy operations. Underground construction operations shall be classified as potentially gassy if either:

(i) Air monitoring discloses 10 percent or more of the lower explosive limit for methane or other flammable gases measured at 12 inches (304.8 mm) +/-0.25 inch (6.35 mm) from the roof, face, floor, or walls in any underground work area for more than a 24-hour period; or

(ii) The history of the geographical area or geological formation indicates that 10 percent or more of the lower explosive limit for methane or other flammable gases is likely to be encountered in such underground operations.

(b) Gassy operations. Underground construction operations shall be classified as gassy if:

(i) Air monitoring discloses 10 percent or more of the lower explosive limit for methane or other flammable gases measured at 12 inches (304.8 mm) +/-0.25 inch (6.35 mm) from the roof, face, floor, or walls in any underground work area for three consecutive days; or

(ii) There has been an ignition of methane or of other flammable gases emanating from the strata that indicates the presence of such gases; or

(iii) The underground construction operation is both connected to an underground work area which is currently classified as gassy and is also subject to a continuous course of air containing the flammable gas concentration.

(c) Declassification to potentially gassy operations. Underground construction gassy operations may be declassified to potentially gassy when air monitoring results remain under 10 percent of the lower explosive limit for methane or other flammable gases for three consecutive days.

(12) Gassy operations—Additional requirements. Only acceptable equipment, maintained in suitable condition, shall be used in gassy operations.

(a) Mobile diesel-powered equipment used in gassy operations shall be either approved in accordance with the requirements of 30 CFR Part 36 (formerly Schedule 31) by MSHA, or shall be demonstrated by the employer to be fully equivalent to such MSHA-approved equipment, and shall be operated in accordance with that part.

(b) Each entrance to a gassy operation shall be prominently posted with signs notifying all entrants of the gassy classification.

(c) Smoking shall be prohibited in all gassy operations and the employer shall be responsible for collecting all personal sources of ignition, such as matches and lighters, from all persons entering a gassy operation.

(d) A fire watch as described in chapter 296-155 WAC, Part H, shall be maintained when hot work is performed.

(e) Once an operation has met the criteria in subsection (11)(a)(i) of this section, warranting classification as gassy, all operations in the affected area, except the following, shall be discontinued until the operation either is in compliance with all of the gassy operation requirements or has been declassified in accordance with (c) of this subsection:

(i) Operations related to the control of the gas concentration;

(ii) Installation of new equipment, or conversion of existing equipment, to comply with this subsection; and

(iii) Installation of above-ground controls for reversing the air flow.

(13) Air quality and monitoring.

(a) General. Air quality limits and control requirements specified in chapter 296-62 WAC, Part H, shall apply except as modified by this subsection.

(b) The employer shall assign a competent person who shall perform all air monitoring required by this section.

(c) Where this section requires monitoring of airborne contaminants "as often as necessary," the competent person shall make a reasonable determination as to which substances to monitor and how frequently to monitor, considering at least the following factors:

(i) Location of jobsite: Proximity to fuel tanks, sewers, gas lines, old landfills, coal deposits, and swamps;

(ii) Geology: Geological studies of the jobsite, particularly involving the soil type and its permeability;

(iii) History: Presence of air contaminants in nearby jobsites, changes in levels of substances monitored on the prior shift; and

(iv) Work practices and jobsite conditions: The use of diesel engines, use of explosives, use of fuel gas, volume and flow of ventilation, visible atmospheric conditions, decompression of the atmosphere, welding, cutting and hot work, and employees' physical reactions to working underground.

(d) The employer shall provide testing and monitoring instruments which are capable of achieving compliance with the provisions of this subsection, and:

(i) Shall maintain the testing and monitoring instruments in good condition;

(ii) Shall calibrate the instruments on a frequency not to exceed 6 months.

(e) Exposure to airborne contaminants shall not exceed the levels established by chapter 296-62 WAC, Part H.

(f) Respirators shall not be substituted for environmental control measures. However, where environmental controls have not yet been developed, or when necessary by the nature of the work involved (for example, welding, sand blasting, lead burning), an employee may work for short periods of time in concentrations of airborne contaminants which exceed the limit of permissible exposure referred to in (d) of this subsection, if the employee wears a respiratory protective device approved by MSHA-NIOSH as protection against the particular hazards involved, and the selection and use of respirators complies with the provisions of chapter 296-62 WAC, Part E.

(g) Employees shall be withdrawn from areas in which there is a concentration of an airborne contaminant which exceeds the permissible exposure limit listed for that

contaminant, except as modified in (t)(i) and (ii) of this subsection.

(h) The atmosphere in all underground work areas shall be tested as often as necessary to assure that the atmosphere at normal atmospheric pressure contains at least 19.5 percent oxygen and no more than 22 percent oxygen.

(i) Tests for oxygen content shall be made before tests for air contaminants.

(j) Field-type oxygen analyzers, or other suitable devices, shall be used to test for oxygen deficiency.

(k) The atmosphere in all underground work areas shall be tested quantitatively for carbon monoxide, nitrogen dioxide, hydrogen sulfide, and other toxic gases, dust, vapors, mists, and fumes as often as necessary to ensure that the permissible exposure limits prescribed in chapter 296-62 WAC, Part H, are not exceeded.

(l) The atmosphere in all underground work areas shall be tested quantitatively for methane and other flammable gases as often as necessary to determine:

(i) Whether action is to be taken under (q), (r), and (s) of this subsection; and

(ii) Whether an operation is to be classified potentially gassy or gassy under subsection (11) of this section.

(m) If diesel-engine or gasoline-engine driven ventilating fans or compressors are used, an initial test shall be made of the inlet air of the fan or compressor, with the engines operating, to ensure that the air supply is not contaminated by engine exhaust.

(n) Testing shall be performed as often as necessary to ensure that the ventilation requirements of subsection (15) of this section are met.

(o) When rapid excavation machines are used, a continuous flammable gas monitor shall be operated at the face with the sensor(s) placed as high and close to the front of the machine's cutter head as practicable.

(p) Whenever air monitoring indicates the presence of 5 ppm or more of hydrogen sulfide, a test shall be conducted in the affected underground work area(s), at least at the beginning and midpoint of each shift, until the concentration of hydrogen sulfide has been less than 5 ppm for 3 consecutive days.

(i) Whenever hydrogen sulfide is detected in an amount exceeding 10 ppm, a continuous sampling and indicating hydrogen sulfide monitor shall be used to monitor the affected work area.

(ii) Employees shall be informed when a concentration of 10 ppm hydrogen sulfide is exceeded.

(iii) The continuous sampling and indicating hydrogen sulfide monitor shall be designed, installed, and maintained to provide a visual and aural alarm when the hydrogen sulfide concentration reaches 15 ppm to signal that additional measures, such as respirator use, increased ventilation, or evacuation, might be necessary to maintain hydrogen sulfide exposure below the permissible exposure limit.

(q) When the competent person determines, on the basis of air monitoring results or other information, that air contaminants may be present in sufficient quantity to be dangerous to life, the employer shall:

(i) Prominently post a notice at all entrances to the underground jobsite to inform all entrants of the hazardous condition; and

(ii) Immediately increase sampling frequency levels to insure workers are not exposed to identified contaminants in excess of the permissible exposure limit(s); and

(iii) Ensure that all necessary precautions are taken to comply with pertinent requirements of this section, and chapter 296-62 WAC.

(r) Whenever five percent or more of the lower explosive limit for methane or other flammable gases is detected in any underground work area(s) or in the air return, steps shall be taken to increase ventilation air volume or otherwise control the gas concentration, unless the employer is operating in accordance with the potentially gassy or gassy operation requirements. Such additional ventilation controls may be discontinued when gas concentrations are reduced below five percent of the lower explosive limit, but shall be reinstated whenever the five percent level is exceeded.

(s) Whenever 10 percent or more of the lower explosive limit for methane or other flammable gases is detected in the vicinity of welding, cutting, or other hot work, such work shall be suspended until the concentration of such flammable gas is reduced to less than 10 percent of the lower explosive limit.

(t) Whenever 20 percent or more of the lower explosive limit for methane or other flammable gases is detected in any underground work area(s) or in the air return:

(i) All employees, except those necessary to eliminate the hazard, shall be immediately withdrawn to a safe location above ground; and

(ii) Employees who remain underground to correct or eliminate the hazard described in (t) above shall be equipped with approved, pressure demand mode, self-contained breathing apparatus, and shall have received adequate training in the proper use of that equipment.

(iii) Electrical power, except for acceptable pumping and ventilation equipment, shall be cut off to the area endangered by the flammable gas until the concentration of such gas is reduced to less than 20 percent of the lower explosive limit.

(14) Additional monitoring for potentially gassy and gassy operations. Operations which meet the criteria for potentially gassy and gassy operations set forth in subsection (13) of this section shall be subject to the additional monitoring requirements of this subsection.

(a) A test for oxygen content shall be conducted in the affected underground work areas and work areas immediately adjacent to such areas at least at the beginning and midpoint of each shift.

(b) When using rapid excavation machines, continuous automatic flammable gas monitoring equipment shall be used to monitor the air at the heading, on the rib, and in the return air duct. The continuous monitor shall signal the heading, and shut down electric power in the affected underground work area, except for acceptable pumping and ventilation equipment, when 20 percent or more of the lower explosive limit for methane or other flammable gases is encountered.

(i) A manual flammable gas monitor shall be used as needed, but at least at the beginning and midpoint of each shift, to ensure that the limits prescribed in subsections (11) and (13) of this section are not exceeded. In addition, a manual electrical shut down control shall be provided near the heading.

(ii) Local gas tests shall be made prior to and continuously during any welding, cutting, or other hot work.

(iii) In underground operations driven by drill-and-blast methods, the air in the affected area shall be tested for flammable gas prior to re-entry after blasting, and continuously when employees are working underground.

(c) Recordkeeping. A record of all air quality tests shall be maintained above ground at the worksite and be made available to the director or his/her representatives upon request. The record shall include the location, date, time, substance and amount monitored. Records of exposures to toxic substances shall be retained in accordance with Part B, chapter 296-62 WAC. All other air quality test records shall be retained until completion of the project.

(15) Ventilation.

(a)(i) Fresh air shall be supplied to all underground work areas in sufficient quantities to prevent dangerous or harmful accumulation of dust, fumes, mists, vapors, or gases.

(ii) Mechanical ventilation shall be provided in all underground work areas except when the employer can demonstrate that natural ventilation provides the necessary air quality through sufficient air volume and air flow.

(b) A minimum of 200 cubic feet (5.7 m³) of fresh air per minute shall be supplied for each employee underground.

(c) The linear velocity of air flow in the tunnel bore, in shafts, and in all other underground work areas shall be at least 30 feet (9.15 m) per minute where blasting or rock drilling is conducted, or where other conditions likely to produce dust, fumes, mists, vapors, or gases in harmful or explosive quantities are present.

(d) The direction of mechanical air flow shall be reversible.

(e) Air that has passed through underground oil or fuel-storage areas shall not be used to ventilate working areas.

(f) Following blasting, ventilation systems shall exhaust smoke and fumes to the outside atmosphere before work is resumed in affected areas.

(g) Ventilation doors shall be designed and installed so that they remain closed when in use, regardless of the direction of the air flow.

(h) When ventilation has been reduced to the extent that hazardous levels of methane or flammable gas may have accumulated, a competent person shall test all affected areas after ventilation has been restored and shall determine whether the atmosphere is within flammable limits before any power, other than for acceptable equipment, is restored or work is resumed.

(i) Whenever the ventilation system has been shut down with all employees out of the underground area, only competent persons authorized to test for air contaminants shall be allowed underground until the ventilation has been restored and all affected areas have been tested for air contaminants and declared safe.

(j) When drilling rock or concrete, appropriate dust control measures shall be taken to maintain dust levels within limits set in chapter 296-155 WAC, Part B-1. Such measures may include, but are not limited to, wet drilling, the use of vacuum collectors, and water mix spray systems.

(k)(i) Internal combustion engines, except diesel-powered engines on mobile equipment, are prohibited underground.

(ii) Mobile diesel-powered equipment used underground in atmospheres other than gassy operations shall be either approved by MSHA in accordance with the provisions of 30 CFR Part 32 (formerly Schedule 24), or shall be demonstrated by the employer to be fully equivalent to such MSHA-approved equipment, and shall be operated in accordance with that Part. (Each brake horsepower of a diesel engine requires at least 100 cubic feet (28.32 m³) of air per minute for suitable operation in addition to the air requirements for personnel. Some engines may require a greater amount of air to ensure that the allowable levels of carbon monoxide, nitric oxide, and nitrogen dioxide are not exceeded.)

(iii) Application shall be made to the mining/explosives section, department of labor and industries, for permission to use specified diesel equipment in a specified underground area and shall include the following:

(A) The type of construction and complete identification data and specifications including analysis of the undiluted exhaust gases of the diesel equipment.

(B) The location where the diesel equipment is to be used.

(C) Before the diesel equipment is taken underground, written permission shall be obtained from the department of labor and industries or its duly authorized representative. A satisfactory test on surface, to show that the exhaust gases do not exceed the maximum percentage of carbon monoxide permitted, shall be required.

(D) Diesel equipment shall only be used underground where the ventilation is controlled by mechanical means and shall not be operated if the ventilating current is less than 100 CFM per horsepower based on the maximum brake horsepower of the engines.

(E) Air measurements shall be made at least once daily in the diesel engine working area and the measurements entered in the Underground Diesel Engine Record Book. Permissible maximum amounts of noxious gases are as follows:

At engine exhaust ports	Carbon Monoxide	.10%	1,000 ppm ³
Next to equipment	Carbon Monoxide	.0035%	35 ppm
General atmosphere	Carbon Monoxide	.0035%	35 ppm
General atmosphere	Nitrogen Dioxide	.0001%	1 ppm
General atmosphere	Aldehydes	.0002%	2 ppm

³ Parts of vapor or gas per million parts of contaminated air by volume at 25°C and 760 mm Hg. pressure.

(1) Potentially gassy or gassy operations shall have ventilation systems installed which shall:

- (i) Be constructed of fire-resistant materials; and
- (ii) Have acceptable electrical systems, including fan motors.

(m) Gassy operations shall be provided with controls located aboveground for reversing the air flow of ventilation systems.

(n) In potentially gassy or gassy operations, wherever mine-type ventilation systems using an offset main fan installed on the surface are used, they shall be equipped with explosion-doors or a weak-wall having an area at least equivalent to the cross-sectional area of the airway.

(16) Illumination.

(a) Sufficient lighting shall be provided, in accordance with the requirements of chapter 296-155 WAC, Part B-1, to

permit safe operations at the face as well as in the general tunnel or shaft area and at the employees' workplace.

(b) Only acceptable portable lighting shall be used within 50 feet (15.24 m) of any underground heading during explosive handling.

(17) Fire prevention and control. Fire prevention and protection requirements applicable to underground construction operations are found in Part D of this chapter except as modified by the following additional standards.

(a) Open flames and fires are prohibited in all underground construction operations except as permitted for welding, cutting, and other hot work operations.

(i) Smoking may be allowed only in areas free of fire and explosion hazards.

(ii) Readily visible signs prohibiting smoking and open flames shall be posted in areas having fire or explosion hazards.

(iii) The carrying of matches, lighters, or other flame-producing smoking materials shall be prohibited in all underground operations where fire or explosion hazards exist.

(b) The employer may store underground no more than a 24-hour supply of diesel fuel for the underground equipment used at the worksite.

(c) The piping of diesel fuel from the surface to an underground location is permitted only if:

(i) Diesel fuel is contained at the surface in a tank whose maximum capacity is no more than the amount of fuel required to supply for a 24-hour period the equipment serviced by the underground fueling station; and

(ii) The surface tank is connected to the underground fueling station by an acceptable pipe or hose system that is controlled at the surface by a valve, and at the shaft bottom by a hose nozzle; and

(iii) The pipe is empty at all times except when transferring diesel fuel from the surface tank to a piece of equipment in use underground; and

(iv) Hoisting operations in the shaft are suspended during refueling operations if the supply piping in the shaft is not protected from damage.

(d)(i) Gasoline shall not be carried, stored, or used underground.

(ii) Acetylene, liquefied petroleum gas, and methylacetylene propadiene stabilized gas may be used underground only for welding, cutting and other hot work, and only in accordance with Part H of this chapter and subsections (13), (15), (17), and (18) of this section.

(e) Oil, grease, and diesel fuel stored underground shall be kept in tightly sealed containers in fire-resistant areas at least 300 feet (91.44 m) from underground explosive magazines, and at least 100 feet (30.48 m) from shaft stations and steeply inclined passageways. Storage areas shall be positioned or diked so that the contents of ruptured or overturned containers will not flow from the storage area.

(f) Flammable or combustible materials shall not be stored above ground within 100 feet (30.48 m) of any access opening to any underground operation. Where this is not feasible because of space limitations at the jobsite, such materials may be located within the 100-foot limit, provided that:

(i) They are located as far as practicable from the opening; and

(ii) Either a fire-resistant barrier of not less than one-hour rating is placed between the stored material and the opening, or additional precautions are taken which will protect the materials from ignition sources.

(g) Fire-resistant hydraulic fluids shall be used in hydraulically-actuated underground machinery and equipment unless such equipment is protected by a fire suppression system or by multipurpose fire extinguisher(s) rated at a sufficient capacity for the type and size of hydraulic equipment involved, but rated at least 4A:4OB:C.

(h)(i) Electrical installations in underground areas where oil, grease, or diesel fuel are stored shall be used only for lighting fixtures.

(ii) Lighting fixtures in storage areas, or within 25 feet (7.62 m) of underground areas where oil, grease, or diesel fuel are stored, shall be approved for Class I, Division 2 locations, in accordance with Part I of this chapter.

(i) Leaks and spills of flammable or combustible fluids shall be cleaned up immediately.

(j) A fire extinguisher of at least 4A:4OB:C rating or other equivalent extinguishing means shall be provided at the head pulley and at the tail pulley of underground belt conveyors, and at 300-foot intervals along the belt.

(k) Any structure located underground or within 100 feet (30.48 m) of an opening to the underground shall be constructed of material having a fire-resistance rating of at least one hour.

(18) Welding, cutting, and other hot work. In addition to the requirements of Part H of this chapter, the following requirements shall apply to underground welding, cutting, and other hot work.

(a) No more than the amount of fuel gas and oxygen cylinders necessary to perform welding, cutting, or other hot work during the next 24-hour period shall be permitted underground.

(b) Noncombustible barriers shall be installed below welding, cutting, or other hot work being done in or over a shaft or raise.

(19) Ground support.

(a) In tunnels (other than hard rock) timber sets, steel rings, steel frames, concrete liners, or other engineered tunnel support systems shall be used. Every tunnel support system shall be designed by a licensed professional engineer. Design specifications shall be available at the worksite.

(b) Portal areas. Portal openings and access areas shall be guarded by shoring, fencing, head walls, shotcreting, or other equivalent protection to ensure safe access of employees and equipment. Adjacent areas shall be scaled or otherwise secured to prevent loose soil, rock, or fractured materials from endangering the portal and access area.

(c) Subsidence areas. The employer shall ensure ground stability in hazardous subsidence areas by shoring, by filling in, or by erecting barricades and posting warning signs to prevent entry.

(d) Underground areas.

(i)(A) A competent person shall inspect the roof, face, and walls of the work area at the start of each shift and as often as necessary to determine ground stability.

(B) Competent persons conducting such inspections shall be protected from loose ground by location, ground support, or equivalent means.

(ii) Ground conditions along haulageways and travelways shall be inspected as frequently as necessary to ensure safe passage.

(iii) Loose ground that might be hazardous to employees shall be taken down, scaled, or supported.

(iv) Torque wrenches shall be used wherever bolts that depend on torsionally applied force are used for ground support.

(v) A competent person shall determine whether rock bolts meet the necessary torque, and shall determine the testing frequency in light of the bolt system, ground conditions, and the distance from vibration sources.

(vi) Suitable protection shall be provided for employees exposed to the hazard of loose ground while installing ground support systems.

(vii) Support sets shall be installed so that the bottoms have sufficient anchorage to prevent ground pressures from dislodging the support base of the sets. Lateral bracing (collar bracing, tie rods, or spreaders) shall be provided between immediately adjacent sets to ensure added stability.

(viii) Damaged or dislodged ground supports that create a hazardous condition shall be promptly repaired or replaced. When replacing supports, the new supports shall be installed before the damaged supports are removed.

(ix) A shield or other type of support shall be used to maintain a safe travelway for employees working in dead-end areas ahead of any support replacement operation.

(e) Shafts.

(i) Shafts and wells over 4 feet (1.219 m) in depth that employees must enter shall be supported by a steel casing, concrete pipe, timber, solid rock, or other suitable material.

(ii)(A) The full depth of the shaft shall be supported by casing or bracing except where the shaft penetrates into solid rock having characteristics that will not change as a result of exposure. Where the shaft passes through earth into solid rock, or through solid rock into earth, and where there is potential for shear, the casing or bracing shall extend at least 5 feet (1.53 m) into the solid rock. When the shaft terminates in solid rock, the casing or bracing shall extend to the end of the shaft or 5 feet (1.53 m) into the solid rock, whichever is less.

(B) The casing or bracing shall extend 42 inches (1.07 m) plus or minus 3 inches (8 cm) above ground level, except that the minimum casing height may be reduced to 12 inches (0.3 m), provided that a standard railing is installed; that the ground adjacent to the top of the shaft is sloped away from the shaft collar to prevent entry of liquids; and that effective barriers are used to prevent mobile equipment operating near the shaft from jumping over the 12-inch (0.3 m) barrier.

(iii) After blasting operations in shafts, a competent person shall determine if the walls, ladders, timbers, blocking, or wedges have loosened. If so, necessary repairs shall be made before employees other than those assigned to make the repairs are allowed in or below the affected areas.

(f) Blasting. This subsection applies in addition to the requirements for blasting and explosives operations, including handling of misfires, which are found in chapter 296-52 WAC.

(i) Blasting wires shall be kept clear of electrical lines, pipes, rails, and other conductive material, excluding earth, to prevent explosives initiation or employee exposure to electric current.

(ii) Following blasting, an employee shall not enter a work area until the air quality meets the requirements of subsection (13) of this section.

(g) Drilling.

(i) A competent person shall inspect all drilling and associated equipment prior to each use. Equipment defects affecting safety shall be corrected before the equipment is used.

(ii) The drilling area shall be inspected for hazards before the drilling operation is started.

(iii) Employees shall not be allowed on a drill mast while the drill bit is in operation or the drill machine is being moved.

(iv) When a drill machine is being moved from one drilling area to another, drill steel, tools, and other equipment shall be secured and the mast shall be placed in a safe position.

(v) Receptacles or racks shall be provided for storing drill steel located on jumbos.

(vi) Employees working below jumbo decks shall be warned whenever drilling is about to begin.

(vii) Drills on columns shall be anchored firmly before starting drilling, and shall be retightened as necessary thereafter.

(viii) The employer shall provide mechanical means on the top deck of a jumbo for lifting unwieldy or heavy material.

(ix) When jumbo decks are over 10 feet (3.05 m) in height, the employer shall install stairs wide enough for two persons.

(x) Jumbo decks more than 10 feet (3.05 m) in height shall be equipped with guardrails on all open sides, excluding access openings of platforms, unless an adjacent surface provides equivalent fall protection.

(xi) Only employees assisting the operator shall be allowed to ride on jumbos, unless the jumbo meets the requirements of subsection (20)(e) of this section.

(xii) Jumbos shall be chocked to prevent movement while employees are working on them.

(xiii) Walking and working surfaces of jumbos shall be maintained to prevent the hazards of slipping, tripping, and falling.

(xiv) Jumbo decks and stair treads shall be designed to be slip-resistant and secured to prevent accidental displacement.

(xv) Scaling bars shall be available at scaling operations and shall be maintained in good condition at all times. Blunted or severely worn bars shall not be used.

(xvi) Before commencing the drill cycle, the face and lifters shall be examined for misfires (residual explosives) and, if found, they shall be removed before drilling commences at the face. Blasting holes shall not be drilled through blasted rock (muck) or water.

(xvii) Employees in a shaft shall be protected either by location or by suitable barrier(s) if powered mechanical loading equipment is used to remove muck containing unfired explosives.

(xviii) A caution sign reading "buried line," or similar wording shall be posted where air lines are buried or otherwise hidden by water or debris.

(20) Haulage.

(a) A competent person shall inspect haulage equipment before each shift.

(i) Equipment defects affecting safety and health shall be corrected before the equipment is used.

(ii) Powered mobile haulage equipment shall be provided with adequate brakes.

(iii) Power mobile haulage equipment, including trains, shall have audible warning devices to warn employees to stay clear. The operator shall sound the warning device before moving the equipment and whenever necessary during travel.

(iv) The operator shall assure that lights which are visible to employees at both ends of any mobile equipment, including a train, are turned on whenever the equipment is operating.

(v) In those cabs where glazing is used, the glass shall be safety glass, or its equivalent, and shall be maintained and cleaned so that vision is not obstructed.

(b) Antirollback devices or brakes shall be installed on inclined conveyor drive units to prevent conveyors from inadvertently running in reverse. Employees shall not be permitted to ride a power-driven chain, belt, or bucket conveyor unless the conveyor is specifically designed for the transportation of persons.

(c) Endless belt-type manlifts are prohibited in underground construction.

(d) General requirements also applicable to underground construction for use of conveyors in construction are found in chapter 296-155 WAC, Part L.

(e) No employee shall ride haulage equipment unless it is equipped with seating for each passenger and protects passengers from being struck, crushed, or caught between other equipment or surfaces. Members of train crews may ride on a locomotive if it is equipped with handholds and nonslip steps or footboards. Requirements applicable to underground construction for motor vehicle transportation of employees are found in chapter 296-155 WAC, Part M.

(f) Conveyor lockout.

(i) Conveyors shall be de-energized and locked out with a padlock, and tagged out with a "Do Not Operate" tag at any time repair, maintenance, or clean-up work is being performed on the conveyor.

(ii) Tags or push button stops are not acceptable.

(iii) Persons shall not be allowed to walk on conveyors except for emergency purposes and then only after the conveyor has been deenergized and locked out in accordance with (f) above, and persons can do so safely.

(g) Powered mobile haulage equipment, including trains, shall not be left unattended unless the master switch or motor is turned off; operating controls are in neutral or park position; and the brakes are set, or equivalent precautions are taken to prevent rolling.

(h) Whenever rails serve as a return for a trolley circuit, both rails shall be bonded at every joint and crossbonded every 200 feet (60.96 m).

(i) When dumping cars by hand, the car dumps shall have tiedown chains, bumper blocks, or other locking or holding devices to prevent the cars from overturning.

(j) Rocker-bottom or bottom-dump cars shall be equipped with positive locking devices to prevent unintended dumping.

(k) Equipment to be hauled shall be loaded and secured to prevent sliding or dislodgement.

(l)(i) Mobile equipment, including rail-mounted equipment, shall be stopped for manual connecting or service work, and;

(ii) Employees shall not reach between moving cars during coupling operations.

(iii) Couplings shall not be aligned, shifted, or cleaned on moving cars or locomotives.

(iv) Safety chains or other connections shall be used in addition to couplers to connect person cars or powder cars whenever the locomotive is uphill of the cars.

(v) When the grade exceeds one percent and there is a potential for runaway cars, safety chains or other connections shall be used in addition to couplers to connect haulage cars or, as an alternative, the locomotive must be downhill of the train.

(vi) Such safety chains or other connections shall be capable of maintaining connection between cars in the event of either coupler disconnect, failure or breakage.

(m) Parked rail equipment shall be chocked, blocked, or have brakes set to prevent inadvertent movement.

(n) Berms, bumper blocks, safety hooks, or equivalent means shall be provided to prevent overtravel and overturning of haulage equipment at dumping locations.

(o) Bumper blocks or equivalent stopping devices shall be provided at all track dead ends.

(p)(i) Only small handtools, lunch pails, or similar small items may be transported with employees in person cars, or on top of a locomotive.

(ii) When small hand tools or other small items are carried on top of a locomotive, the top shall be designed or modified to retain them while traveling.

(q)(i) Where switching facilities are available, occupied personnel cars shall be pulled, not pushed. If personnel cars must be pushed and visibility of the track ahead is hampered, then a qualified person shall be stationed in the lead car to give signals to the locomotive operator.

(ii) Crew trips shall consist of personnel loads only.

(21) Electrical safety. This subsection applies in addition to the general requirements for electrical safety which are found in Part I of this chapter.

(a) Electric power lines shall be insulated or located away from water lines, telephone lines, air lines, or other conductive materials so that a damaged circuit will not energize the other systems.

(b) Lighting circuits shall be located so that movement of personnel or equipment will not damage the circuits or disrupt service.

(c) Oil-filled transformers shall not be used underground unless they are located in a fire-resistant enclosure suitably vented to the outside and surrounded by a dike to retain the contents of the transformers in the event of rupture.

(22) Hoisting unique to underground construction except as modified by this section, the following provisions of chapter 296-155 WAC, Part L apply: Requirements for cranes are found in WAC 296-155-525. WAC 296-155-48533 contains rules applicable to crane hoisting of personnel, except, that the limitations imposed by WAC 296-155-48533(2) do not apply to the routine access of employees to the underground via a shaft. Requirements for personnel

hoists, material hoists, and elevators are found in WAC 296-155-530 and in this subsection.

(a) General requirements for cranes and hoists.

(i) Materials, tools, and supplies being raised or lowered, whether within a cage or otherwise, shall be secured or stacked in a manner to prevent the load from shifting, snagging, or falling into the shaft.

(ii) A warning light suitably located to warn employees at the shaft bottom and subsurface shaft entrances shall flash whenever a load is above the shaft bottom or subsurface entrances, or the load is being moved in the shaft. This subsection does not apply to fully enclosed hoistways.

(iii) Whenever a hoistway is not fully enclosed and employees are at the shaft bottom, conveyances or equipment shall be stopped at least 15 feet (4.57 m) above the bottom of the shaft and held there until the signalperson at the bottom of the shaft directs the operator to continue lowering the load, except that the load may be lowered without stopping if the load or conveyance is within full view of a bottom signalperson who is in constant voice communication with the operator.

(iv)(A) Before maintenance, repairs, or other work is commenced in the shaft served by a cage, skip, or bucket, the operator and other employees in the area shall be informed and given suitable instructions.

(B) A sign warning that work is being done in the shaft shall be installed at the shaft collar, at the operator's station, and at each underground landing.

(v) Any connection between the hoisting rope and the cage or skip shall be compatible with the type of wire rope used for hoisting.

(vi) Spin-type connections, where used, shall be maintained in a clean condition and protected from foreign matter that could affect their operation.

(vii) Cage, skip, and load connections to the hoist rope shall be made so that the force of the hoist pull, vibration, misalignment, release of lift force, or impact will not disengage the connection. Only closed shackles shall be used for cage and skip rigging.

(viii) When using wire rope wedge sockets, means shall be provided to prevent wedge escapement and to ensure that the wedge is properly seated.

(b) Additional requirements for cranes. Cranes shall be equipped with a limit switch to prevent overtravel at the boom tip. Limit switches are to be used only to limit travel of loads when operational controls malfunction and shall not be used as a substitute for other operational controls.

(c) Additional requirements for hoists.

(i) Hoists shall be designed so that the load hoist drum is powered in both directions of rotation, and so that brakes are automatically applied upon power release or failure.

(ii) Control levers shall be of the "deadman type" which return automatically to their center (neutral) position upon release.

(iii) When a hoist is used for both personnel hoisting and material hoisting, load and speed ratings for personnel and for materials shall be assigned to the equipment.

(iv) Hoist machines with cast metal parts shall not be used.

(v) Material hoisting may be performed at speeds higher than the rated speed for personnel hoisting if the hoist and

components have been designed for such higher speeds and if shaft conditions permit.

(vi) Employees shall not ride on top of any cage, skip, or bucket except when necessary to perform inspection or maintenance of the hoisting system, in which case they shall be protected by a body belt/harness system to prevent falling.

(vii) Personnel and materials (other than small tools and supplies secured in a manner that will not create a hazard to employees) shall not be hoisted together in the same conveyance. However, if the operator is protected from the shifting of materials, then the operator may ride with materials in cages or skips which are designed to be controlled by an operator within the cage or skip.

(viii) Line speed shall not exceed the design limitations of the systems.

(ix) Hoists shall be equipped with landing level indicators at the operator's station. Marking of the hoist rope does not satisfy this requirement.

(x) Whenever glazing is used in the hoist house, it shall be safety glass, or its equivalent, and be free of distortions and obstructions.

(xi) A fire extinguisher that is rated at least 2A:10B:C (multipurpose, dry chemical) shall be mounted in each hoist house.

(xii) Hoist controls shall be arranged so that the operator can perform all operating cycle functions and reach the emergency power cutoff without having to reach beyond the operator's normal operating position.

(xiii) Hoists shall be equipped with limit switches to prevent overtravel at the top and bottom of the hoistway.

(xiv) Limit switches are to be used only to limit travel of loads when operational controls malfunction and shall not be used as a substitute for other operational controls.

(xv) Hoist operators shall be provided with a closed-circuit voice communication system to each landing station, with speaker-microphones so located that the operator can communicate with individual landing stations during hoist use.

(xvi) When sinking shafts 75 feet (22.86 m) or less in depth, cages, skips, and buckets that may swing, bump, or snag against shaft sides or other structural protrusions shall be guided by fenders, rails, ropes, or a combination of those means.

(xvii) When sinking shafts more than 75 feet (22.86 m) in depth, all cages, skips, and buckets shall be rope or rail-guided to within a rail length from the sinking operation.

(xviii) Cages, skips, and buckets in all completed shafts, or in all shafts being used as completed shafts, shall be rope or rail-guided for the full length of their travel.

(xix) Wire rope used in load lines of material hoists shall be capable of supporting, without failure, at least five times the maximum intended load or the factor recommended by the rope manufacturer, whichever is greater. Refer to chapter 296-155 WAC, Part L, for design factors for wire rope used in personnel hoists. The design factors shall be calculated by dividing the breaking strength of wire rope, as reported in the manufacturer's rating tables, by the total static load, including the weight of the wire rope in the shaft when fully extended.

(xx) A competent person shall visually check all hoisting machinery, equipment, anchorages, and hoisting

rope at the beginning of each shift and during hoist use, as necessary.

(xxi) Each safety device shall be checked by a competent person at least weekly during hoist use to ensure suitable operation and safe condition.

(xxii) In order to ensure suitable operation and safe condition of all functions and safety devices, each hoist assembly shall be inspected and load-tested to 100 percent of its rated capacity: At the time of installation; after any repairs or alterations affecting its structural integrity; after the operation of any safety device; and annually when in use. The employer shall prepare a certification record which includes the date each inspection and load-test was performed; the signature of the person who performed the inspection and test; and a serial number or other identifier for the hoist that was inspected and tested. The most recent certification record shall be maintained on file until completion of the project.

(xxiii) Before hoisting personnel or material, the operator shall perform a test run of any cage or skip whenever it has been out of service for one complete shift, and whenever the assembly or components have been repaired or adjusted.

(xiv) Unsafe conditions shall be corrected before using the equipment.

(d) Additional requirements for personnel hoists.

(i) Hoist drum systems shall be equipped with at least two means of stopping the load, each of which shall be capable of stopping and holding 150 percent of the hoist's rated line pull. A broken-rope safety, safety catch, or arrestment device is not a permissible means of stopping under this subsection.

(ii) The operator shall remain within sight and sound of the signals at the operator's station.

(iii) All sides of personnel cages shall be enclosed by one-half inch (12.70 mm) wire mesh (not less than No. 14 gauge or equivalent) to a height of not less than 6 feet (1.83 m). However, when the cage or skip is being used as a work platform, its sides may be reduced in height to 42 inches (1.07 m) when the conveyance is not in motion.

(iv) All personnel cages shall be provided with a positive locking door that does not open outward.

(v) All personnel cages shall be provided with a protective canopy. The canopy shall be made of steel plate, at least 3/16 -inch (4.763 mm) in thickness, or material of equivalent strength and impact resistance. The canopy shall be sloped to the outside, and so designed that a section may be readily pushed upward to afford emergency egress. The canopy shall cover the top in such a manner as to protect those inside from objects falling in the shaft.

(vi) Personnel platforms operating on guide rails or guide ropes shall be equipped with broken-rope safety devices, safety catches, or arrestment devices that will stop and hold 150 percent of the weight of the personnel platform and its maximum rated load.

(vii) During sinking operations in shafts where guides and safeties are not yet used, the travel speed of the personnel platform shall not exceed 200 feet (60.96 m) per minute. Governor controls set for 200 feet (60.96 m) per minute shall be installed in the control system and shall be used during personnel hoisting.

(viii) The personnel platform may travel over the controlled length of the hoistway at rated speeds up to 600 feet (182.88 m) per minute during sinking operations in shafts where guides and safeties are used.

(ix) The personnel platform may travel at rated speeds greater than 600 feet (182.88 m) per minute in complete shafts.

[Statutory Authority: Chapter 49.17 RCW. 95-04-007, § 296-155-730, filed 1/18/95, effective 3/1/95; 94-15-096 (Order 94-07), § 296-155-730, filed 7/20/94, effective 9/20/94; 91-11-070 (Order 91-01), § 296-155-730, filed 5/20/91, effective 6/20/91; 90-03-029 (Order 89-20), § 296-155-730, filed 1/11/90, effective 2/26/90. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-730, filed 1/21/86; Order 76-29, § 296-155-730, filed 9/30/76; Order 74-26, § 296-155-730, filed 5/7/74, effective 6/6/74.]

WAC 296-155-735 Caissons. (1) Wherever, in caisson work in which compressed air is used, and the working chamber is less than 11 feet in length, and when such caissons are at any time suspended or hung while work is in progress so that the bottom of the excavation is more than 9 feet below the deck of the working chamber, a shield shall be erected therein for the protection of the employees.

(2) Shafts shall be subjected to a hydrostatic or airpressure test, at which pressure they shall be tight. The shaft shall be stamped on the outside shell about 12 inches from each flange to show the pressure to which they have been subjected.

(3) Whenever a shaft is used, it shall be provided, where space permits, with a safe, proper, and suitable staircase for its entire length, including landing platforms, not more than 20 feet apart. Where this is impracticable, suitable ladders shall be installed with landing platforms located about 20 feet apart to break the climb.

(4) All caissons, having a diameter or side greater than 10 feet shall be provided with a man lock and shaft for the exclusive use of employees.

(5) In addition to the gauge in the locks, an accurate gauge shall be maintained on the outer and inner side of each bulkhead. These gauges shall be accessible at all times and kept in accurate working order.

(6) In caisson operations where employees are exposed to compressed air working environments, the requirements contained in WAC 296-155-745 shall be complied with.

[Order 74-26, § 296-155-735, filed 5/7/74, effective 6/6/74.]

WAC 296-155-740 Cofferdams. (1) If overtopping of the cofferdam by high waters is possible, means shall be provided for controlled flooding of the work area.

(2) Warning signals for evacuation of employees in case of emergency shall be developed and posted.

(3) Cofferdam walkways, bridges, or ramps with at least two means of rapid exit, shall be provided with guardrails as specified in Part K of this chapter.

(4) Manways and ladderways shall be installed separately from the hoistways and partitioned off to prevent hoisted materials from protruding into or falling into manways and/or ladderways.

(5) Pumping equipment shall be located on substantially constructed platforms and where installed in such a position that persons must work below, toe boards shall be installed on the platform.

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(6) Cofferdams located close to navigable shipping channels shall be protected from vessels in transit, where possible.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-24-051, § 296-155-740, filed 11/27/96, effective 2/1/97. Statutory Authority: Chapter 49.17 RCW. 95-10-016, § 296-155-740, filed 4/25/95, effective 10/1/95; Order 74-26, § 296-155-740, filed 5/7/74, effective 6/6/74.]

WAC 296-155-745 Compressed air. (1) General provisions.

(a) There shall be present, at all times, at least one competent person designated by and representing the employer, who shall be familiar with this part in all respects and responsible for full compliance with these and other applicable parts.

(b) Every employee shall be instructed in the rules and regulations which concern their safety or the safety of others.

(2) Medical attendance, examination, and regulations.

(a) There shall be retained one or more licensed physicians familiar with and experienced in the physical requirements and the medical aspects of compressed air work and the treatment of decompression illness. They shall be available at all times while work is in progress in order to provide medical supervision of employees employed in compressed air work. They shall be physically qualified and be willing to enter a pressurized environment.

(b) No employee shall be permitted to enter a compressed air environment until they have been examined by the physician and reported to be physically qualified to engage in such work.

(c) In the event an employee is absent from work for 10 days, or is absent due to sickness or injury, they shall not resume work until they are reexamined by the physician, and their physical condition reported, as provided in this subsection, to be such as to permit them to work in compressed air.

(d) After an employee has been employed continuously in compressed air for a period designated by the physician, but not to exceed 1 year, the employee shall be reexamined by the physician to determine if they are still physically qualified to engage in compressed air work.

(e) Such physician shall at all times keep a complete and full record of examinations made by themselves. The physician shall also keep an accurate record of any decompression illness or other illness or injury incapacitating any employee for work, and of all loss of life that occurs in the operation of a tunnel, caisson, or other compartment in which compressed air is used.

(f) Records shall be available for the inspection by the director or his/her representatives, and a copy thereof shall be forwarded to the department within 48 hours following the occurrence of the accident, death, injury, or decompression illness. It shall state as fully as possible the cause of said death or decompression illness, and the place where the injured or sick employee was taken, and such other relative information as may be required by the director.

(g) A fully equipped first-aid station shall be provided at each tunnel project regardless of the number of persons employed. An ambulance or transportation suitable for a litter case shall be at each project.

(h) Where tunnels are being excavated from portals more than 5 road miles apart, a first-aid station and transportation facilities shall be provided at each portal.

(i) A medical lock shall be established and maintained in immediate working order whenever air pressure in the working chamber is increased above the normal atmosphere.

(j) The medical lock shall:

(i) Have at least 6 feet of clear headroom at the center, and be subdivided into not less than two compartments;

(ii) Be readily accessible to employees working under compressed air;

(iii) Be kept ready for immediate use for at least 5 hours subsequent to the emergence of any employee from the working chamber;

(iv) Be properly heated, lighted and ventilated;

(v) Be maintained in a sanitary condition;

(vi) Have a nonshatterable port through which the occupant(s) may be kept under constant observation;

(vii) Be designed for a working pressure of 75 p.s.i.g.;

(viii) Be equipped with internal controls which may be overridden by external controls;

(ix) Be provided with air pressure gauges to show the air pressure within each compartment to observers inside and outside the medical lock;

(x) Be equipped with a manual type sprinkler system that can be activated inside the lock or by the outside lock tender;

(xi) Be provided with oxygen lines and fittings leading into external tanks. The lines shall be fitted with check valves to prevent reverse flow. The oxygen system inside the chamber shall be of a closed circuit design and be so designed as to automatically shut off the oxygen supply whenever the fire system is activated.

(xii) Be in constant charge of an attendant under the direct control of the retained physician. The attendant shall be trained in the use of the lock and suitably instructed regarding steps to be taken in the treatment of employee exhibiting symptoms compatible with a diagnosis of decompression illness;

(xiii) Be adjacent to an adequate emergency medical facility;

(xiv) The medical facility shall be equipped with demand-type oxygen inhalation equipment approved by the U.S. Bureau of Mines or Mine Safety and Health Administration (MSHA) and the National Institute for Occupational Safety and Health (NIOSH);

(xv) Be capable of being maintained at a temperature, in use, not to exceed 90°F. nor be less than 70°F.; and

(xvi) Be provided with sources of air, free of oil and carbon monoxide, for normal and emergency use, which are capable of raising the air pressure in the lock from 0 to 75 p.s.i.g. in 5 minutes.

(k) Identification badges shall be furnished to all employees, indicating that the wearer is a compressed air worker. A permanent record shall be kept of all identification badges issued. The badge shall give the employee's name, address of the medical lock, the telephone number of the licensed physician for the compressed air project, and contain instructions that in case of emergency of unknown or doubtful cause or illness, the wearer shall be rushed to the medical lock. The badge shall be worn at all times—off the job, as well as on the job.

(3) Telephone and signal communication. Effective and reliable means of communication, such as bells, whistles, or

telephones, shall be maintained at all times between all the following locations;

(a) The working chamber face;

(b) The working chamber side of the man lock near the door;

(c) The interior of the man lock;

(d) Lock attendant's station;

(e) The compressor plant;

(f) The first-aid station;

(g) The emergency lock (if one is required); and

(h) The special decompression chamber (if one is required).

(4) Signs and records.

(a) The time of decompression shall be posted in each man lock as follows:

TIME OF DECOMPRESSION FOR THIS LOCK

..... pounds to pounds in minutes.

..... pounds to pounds in minutes.

(Signed by)
(Superintendent)

This form shall be posted in the man lock at all times.

(b) Any code of signals used shall be conspicuously posted near workplace entrances and such other locations as may be necessary to bring them to the attention of all employees concerned.

(c) For each 8-hour shift, a record of employees employed under air pressure shall be kept by an employee who shall remain outside the lock near the entrance. This record shall show the period each employee spends in the air chamber and the time taken from decompression. A copy shall be submitted to the appointed physician after each shift.

(5) Compression.

(a) Every employee going under air pressure for the first time shall be instructed on how to avoid excessive discomfort.

(b) During the compression of employees, the pressure shall not be increased to more than 3 p.s.i.g. within the first minute. The pressure shall be held at 3 p.s.i.g. and again at 7 p.s.i.g. sufficiently long to determine if any employees are experiencing discomfort.

(c) After the first minute the pressure shall be raised uniformly and at a rate not to exceed 10 p.s.i. per minute.

(d) If any employee complains of discomfort, the pressure shall be held to determine if the symptoms are relieved. If, after 5 minutes the discomfort does not disappear, the lock attendant shall gradually reduce the pressure until the employee signals that the discomfort has ceased. If the employee does not indicate that the discomfort has disappeared, the lock attendant shall reduce the pressure to atmospheric and the employee shall be released from the lock.

(e) No employee shall be subjected to pressure exceeding 50 pounds per square inch except in an emergency.

(6) Decompression.

(a) Decompression to normal condition shall be in accordance with the decompression tables in Appendix A of this part.

(b) In the event it is necessary for an employee to be in compressed air more than once in a 24-hour period, the appointed physician shall be responsible for the establishment of methods and procedures of decompression applicable to repetitive exposures.

(c) If decanting is necessary, the appointed physician shall establish procedures before any employee is permitted to be decompressed by decanting methods. The period of time that the employees spend at atmospheric pressure between the decompression following the shift and recompression shall not exceed 5 minutes.

(7) Man locks and special decompression chambers.

(a) Man locks.

(i) Except in emergency, no employees employed in compressed air shall be permitted to pass from the working chamber to atmospheric pressure until after decompression, in accordance with the procedures in this part.

(ii) The lock attendant in charge of a man lock shall be under the direct supervision of the appointed physician. The lock attendant shall be stationed at the lock controls on the free air side during the period of compression and decompression and shall remain at the lock control station whenever there are persons in the working chamber or in the man lock.

(iii) Except where air pressure in the working chamber is below 12 p.s.i.g., each man lock shall be equipped with automatic controls which, through taped programs, cams, or similar apparatus, shall automatically regulate decompressions. It shall also be equipped with manual controls to permit the lock attendant to override the automatic mechanism in the event of an emergency, as provided in item (viii) of this subdivision.

(iv) A manual control, which can be used in the event of an emergency, shall be placed inside the man lock.

(v) A clock, thermometer, and continuous recording pressure gauge with a 4-hour graph shall be installed outside of each man lock and shall be changed prior to each shift's decompression. The chart shall be of sufficient size to register a legible record of variations in pressure within the man lock and shall be visible to the lock attendant. A copy of each graph shall be submitted to the appointed physician after each shift. In addition, a pressure gauge, clock, and thermometer shall also be installed in each man lock. Additional fittings shall be provided so that the test gauges may be attached whenever necessary.

(vi) Except where air pressure is below 12 p.s.i.g. and there is no danger of rapid flooding, all caissons having a working area greater than 150 square feet, and each bulkhead in tunnels of 14 feet or more in diameter, or equivalent area, shall have at least two locks in perfect working condition, one of which shall be used exclusively as a man lock, the other, as a materials lock.

(vii) Where only a combination man-and-materials lock is required, this single lock shall be of sufficient capacity to hold the employees constituting two successive shifts.

(viii) Emergency locks shall be large enough to hold an entire heading shift and a limit maintained of 12 p.s.i.g. There shall be a chamber available for oxygen decompression therapy to 28 p.s.i.g.

(ix) The man lock shall be large enough so that those using it are not compelled to be in a cramped position and

shall not have less than 5 feet clear head room at the center and a minimum of 30 cubic feet of air space per occupant.

(x) Locks on caissons shall be so located that the bottom door shall be not less than 3 feet above the water level surrounding the caisson on the outside. (The water level, where it is affected by tides, is construed to mean high tide.)

(xi) In addition to the pressure gauge in the locks, an accurate pressure gauge shall be maintained on the outer and inner side of each bulkhead. These gauges shall be accessible at all times and shall be kept in accurate working order.

(xii) Man locks shall have an observation port at least 4 inches in diameter located in such a position that all occupants of the man lock may be observed from the working chamber and from the free air side of the lock.

(xiii) Adequate ventilation in the lock shall be provided.

(xiv) Man locks shall be maintained at a minimum temperature of 70°F.

(xv) When locks are not in use and employees are in the working chamber, lock doors shall be kept open to the working chamber, where practicable.

(xvi) Provision shall be made to allow for rescue parties to enter the tunnel if the working force is disabled.

(xvii) A special decompression chamber of sufficient size to accommodate the entire force of employees being decompressed at the end of a shift shall be provided whenever the regularly established working period requires total time of decompression exceeding 75 minutes.

(b) Special decompression chamber.

(i) The headroom in the special decompression chamber shall be not less than a minimum 7 feet and the cubical content shall provide at least 50 cubic feet of airspace for each employee. For each occupant, there shall be provided 4 square feet of free walking area and 3 square feet of seating space, exclusive of area required for lavatory and toilet facilities. The rated capacity shall be based on the stated minimum space per employee and shall be posted at the chamber entrance. The posted capacity shall not be exceeded, except in case of emergency.

(ii) Each special decompression chamber shall be equipped with the following:

(A) A clock or clocks suitably placed so that the attendant and the chamber occupants can readily ascertain the time;

(B) Pressure gauges which will indicate to the attendants and to the chamber occupants the pressure in the chamber;

(C) Valves to enable the attendant to control the supply and discharge of compressed air into and from the chamber.

(D) Valves and pipes, in connection with the air supply and exhaust, arranged so that the chamber pressure can be controlled from within and without;

(E) Effective means of oral intercommunication between the attendant, occupants of the chamber, and the air compressor plant; and

(F) An observation port at the entrance to permit observation of the chamber occupants.

(iii) Seating facilities in special decompression chambers shall be so arranged as to permit a normal sitting posture without cramping. Seating space, not less than 18 inches by 24 inches wide, shall be provided per occupant.

(iv) Adequate toilet and washing facilities, in a screened or enclosed recess, shall be provided. Toilet bowls shall

have a built-in protector on the rim so that an air space is created when the seat lid is closed.

(v) Fresh and pure drinking water shall be available. This may be accomplished by either piping water into the special decompression chamber and providing drinking fountains, or by providing individual canteens, or by some other sanitary means. Community drinking vessels are prohibited.

(vi) No refuse or discarded material of any kind shall be permitted to accumulate, and the chamber shall be kept clean.

(vii) Unless the special decompression chamber is serving as the man lock to atmospheric pressure, the special decompression chamber shall be situated, where practicable, adjacent to the man lock on the atmospheric pressure side of the bulkhead. A passageway shall be provided, connecting the special chamber with the man lock, to permit employees in the process of decompression to move from the man lock to the special chamber without a reduction in the ambient pressure from that designated for the next stage of decompression. The passageway shall be so arranged as to not interfere with the normal operation of the man lock, nor with the release of the occupants of the special chamber to atmospheric pressure upon the completion of the decompression procedure.

(8) Compressor plant and air supply.

(a) At all times there shall be a thoroughly experienced, competent, and reliable person on duty at the air control valves as a gauge tender who shall regulate the pressure in the working areas. During tunneling operations, one gauge tender may regulate the pressure in not more than two headings: Provided; That the gauges and controls are all in one location. In caisson work, there shall be a gauge tender for each caisson.

(b) The low air compressor plant shall be of sufficient capacity to not only permit the work to be done safely, but shall also provide a margin to meet emergencies and repairs.

(c) Low air compressor units shall have at least two independent and separate sources of power supply and each shall be capable of operating the entire low air plant and its accessory systems.

(d) The capacity, arrangement, and number of compressors shall be sufficient to maintain the necessary pressure without overloading the equipment and to assure maintenance of such pressure in the working chamber during periods of breakdown, repair, or emergency.

(e) Switching from one independent source of power supply to the other shall be done periodically to ensure that workability of the apparatus in an emergency.

(f) Duplicate low-pressure air feedlines and regulating valves shall be provided between the source of air supply and a point beyond the locks with one of the lines extending to within 100 feet of the working face.

(g) All high-pressure and low-pressure air supply lines shall be equipped with check valves.

(h) Low-pressure air shall be regulated automatically. In addition, manually operated valves shall be provided for emergency conditions.

(i) The air intakes for all air compressors shall be located at a place where fumes, exhaust gases, and other air contaminants will be at a minimum.

(j) Gauges indicating the pressure in the working chamber shall be installed in the compressor building, the lock attendant's station, and at the employer's field office.

(9) Ventilation and air quality.

(a) Exhaust valves and exhaust pipes shall be provided and operated so that the working chamber shall be well ventilated, and there shall be no pockets of dead air. Outlets may be required at intermediate points along the main low-pressure air supply line to the heading to eliminate such pockets of dead air. The quantity of ventilation air shall be not less than 30 cubic feet per minute.

(b) The air in the workplace shall be analyzed by the employer not less than once each shift, and records of such tests shall be kept on file at the place where the work is in progress. The test results shall be within the threshold limit values specified in part B of this chapter, for hazardous gases, and within 10 percent of the lower explosive limit of flammable gases. If these limits are not met, immediate action to correct the situation shall be taken by the employer.

(c) The temperature of all working chambers which are subjected to air pressure shall, by means of after-coolers or other suitable devices, be maintained at a temperature not to exceed 85°F.

(d) Forced ventilation shall be provided during decompression. During the entire decompression period, forced ventilation through chemical or mechanical air purifying devices that will ensure a source of fresh air shall be provided.

(e) Whenever heat-producing machines (moles, shields) are used in compressed air tunnel operations, a positive means of removing the heat build-up at the heading shall be provided.

(10) Electricity.

(a) All lighting in compressed-air chambers shall be by electricity exclusively, and two independent electric-lighting systems with independent sources of supply shall be used. The emergency source shall be arranged to become automatically operative in the event of failure of the regularly used source.

(b) The minimum intensity of light on any walkway, ladder, stairway, or working level shall be not less than 10 foot-candles, and in all workplaces the lighting shall at all times be such as to enable employees to see clearly.

(c) All electrical equipment, and wiring for light and power circuits, shall comply with requirements of Part I, of this standard, for use in damp, hazardous, high temperature, and compressed air environments.

(d) External parts of lighting fixtures and all other electrical equipment, when within 8 feet of the floor, shall be constructed of noncombustible, nonabsorptive, insulating materials, except that metal may be used if it is effectively grounded.

(e) Portable lamps shall be equipped with noncombustible, nonabsorptive, insulating sockets, approved handles, basket guards, and approved cords.

(f) The use of worn or defective portable and pendant conductors is prohibited.

(11) Sanitation.

(a) Sanitary, heated, lighted, and ventilated dressing rooms and drying rooms shall be provided for all employees engaged in compressed air work. Such rooms shall contain suitable benches and lockers. Bathing accommodations

(showers at the ratio of one to 10 employees per shift), equipped with running hot and cold water, and suitable and adequate toilet accommodations, shall be provided. One toilet for each 15 employees, or fractional part thereof, shall be provided.

(b) When the toilet bowl is shut by a cover, there should be an air space so that the bowl or bucket does not implode when pressure is increased.

(c) All parts of caissons and other working compartments shall be kept in a sanitary condition.

(12) Fire prevention and protection.

(a) Fire fighting equipment shall be available at all times and shall be maintained in working condition.

(b) While welding or flame-cutting is being done in compressed air, a firewatch with a fire hose or approved extinguisher shall stand by until such operation is completed.

(c) Shafts and caissons containing flammable material of any kind, either above or below ground, shall be provided with a waterline and a fire hose connected thereto, so arranged that all points of the shaft or caisson are within reach of the hose stream.

(d) Fire hose shall be at least 1 1/2 inches in nominal diameter; the water pressure shall at all times be adequate for efficient operation of the type of nozzle used; and the water supply shall be such as to ensure an uninterrupted flow. Fire hose, when not in use, shall be located or guarded to prevent injury thereto.

(e) The power house, compressor house, and all buildings housing ventilating equipment, shall be provided with at least one hose connection in the waterline, with a fire hose connected thereto. A fire hose shall be maintained within reach of structures of wood over or near shafts.

(f) Tunnels shall be provided with a 2-inch minimum diameter waterline extending into the working chamber and to within 100 feet of the working face. Such line shall have hose outlets with 100 feet of fire hose attached and maintained as follows: One at the working face; one immediately inside of the bulkhead of the working chamber; and one immediately outside such bulkhead. In addition, hose outlets shall be provided at 200-foot intervals throughout the length of the tunnel, and 100 feet of fire hose shall be attached to the outlet nearest to any location where flammable material is being kept or stored or where any flame is being used.

(g) In addition to fire hose protection required by this part, on every floor of every building not under compressed air, but used in connection with the compressed air work, there shall be provided at least one approved fire extinguisher of the proper type for the hazards involved. At least two approved fire extinguishers shall be provided in the working chamber as follows: One at the working face and one immediately inside the bulkhead (pressure side). Extinguishers in the working chamber shall use water as the primary extinguishing agent and shall not use any extinguishing agent which could be harmful to the employees in the working chamber. The fire extinguisher shall be protected from damage.

(h) Highly combustible materials shall not be used or stored in the working chamber. Wood, paper, and similar combustible material shall not be used in the working chamber in quantities which could cause a fire hazard. The compressor building shall be constructed of noncombustible material.

(i) Man locks shall be equipped with a manual type fire extinguisher system that can be activated inside the man lock and also by the outside lock attendant. In addition, a fire hose and portable fire extinguisher shall be provided inside and outside the man lock. The portable fire extinguisher shall be the dry chemical type.

(j) Equipment, fixtures, and furniture in man locks and special decompression chambers shall be constructed of noncombustible materials. Bedding, etc., shall be chemically treated so as to be fire resistant.

(k) Head frames shall be constructed of structural steel or open frame-work fireproofed timber. Head houses and other temporary surface buildings or structures within 100 feet of the shaft, caisson, or tunnel opening shall be built of fire-resistant materials.

(l) No oil, gasoline, or other combustible materials shall be stored within 100 feet of any shaft, caisson, or tunnel opening, except that oils may be stored in suitable tanks in isolated fireproof buildings, provided such buildings are not less than 50 feet from any shaft, caisson, or tunnel opening, or any building directly connected thereto.

(m) Positive means shall be taken to prevent leaking flammable liquids from flowing into the areas specifically mentioned in the preceding subdivision.

(n) All explosives used in connection with compressed air work shall be selected, stored, transported, and used as specified in part T of this chapter.

(13) Bulkheads and safety screens.

(a) Intermediate bulkheads with locks, or intermediate safety screens or both, are required where there is danger of rapid flooding.

(b) In tunnels 16 feet or more in diameter, hanging walkways shall be provided from the face to the man lock as high in the tunnel as practicable, with at least 6 feet of head room. Walkways shall be constructed of noncombustible material. Standard railings shall be securely installed throughout the length of all walkways on open sides in accordance with Part K of this chapter. Where walkways are ramped under safety screens, the walkway surface shall be skidproofed by cleats or by equivalent means.

(c) Bulkheads used to contain compressed air shall be tested, where practicable, to prove their ability to resist the highest air pressure which may be expected to be used.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-24-051, § 296-155-745, filed 11/27/96, effective 2/1/97. Statutory Authority: Chapter 49.17 RCW. 95-10-016, § 296-155-745, filed 4/25/95, effective 10/1/95; 94-15-096 (Order 94-07), § 296-155-745, filed 7/20/94, effective 9/20/94; 88-23-054 (Order 88-25), § 296-155-745, filed 11/14/88; Order 74-26, § 296-155-745, filed 5/7/74, effective 6/6/74.]

WAC 296-155-74501 Appendix A—Decompression tables.

APPENDIX A—DECOMPRESSION TABLES

(1) **Explanation.** The decompression tables are computed for working chamber pressures from 0 to 14 pounds, and from 14 to 50 pounds per square inch gauge inclusive by 2-pound increments and for exposure times for each pressure extending from one-half to over 8 hours inclusive. Decompressions will be conducted by two or more stages with a maximum of four stages, the latter for a

working chamber pressure of 40 pounds per square inch gauge or over.

Stage 1 consists of a reduction in ambient pressure ranging from 10 to a maximum of 16 pounds per square inch, but in no instance will the pressure be reduced below 4 pounds at the end of stage 1. This reduction in pressure in stage 1 will always take place at a rate not greater than 5 pounds per minute.

Further reduction in pressure will take place during stage 2 and subsequent stages as required at a slower rate, but in no event at a rate greater than 1 pound per minute.

Decompression Table No. 1 indicates in the body of the table the total decompression time in minutes for various combinations of working chamber pressure and exposure time.

Decompression Table No. 2 indicates for the same various combinations of working chamber pressure and exposure time the following:

- (a) The number of stages required;
- (b) The reduction in pressure and the terminal pressure for each required stage;
- (c) The time in minutes through which the reduction in pressure is accomplished for each required stage;
- (d) The pressure reduction rate in minutes per pound for each required stage;

Important note: The pressure reduction in each stage is accomplished at a uniform rate. Do not interpolate between values shown on the tables. Use the next higher value of working chamber pressure or exposure time should the actual working chamber pressure or the actual exposure time, respectively, fall between those for which calculated values are shown in the body of the tables.

Examples:

Example No. 1:

4 hours working period at 20 pounds gauge.

Decompression Table No. 1:

20 pounds for 4 hours, total decompression time. 43 minutes.

Decompression Table No. 2:

Stage 1: Reduce pressure from 20 pounds to 4 pounds at the uniform rate of 5 pounds per minute. Elapsed time stage 1: 16/5— 3 minutes.

Stage 2 (final stage): Reduce pressure at a uniform rate from 4 pounds to 0-pound gage over a period of 40 minutes. Rate—0.10 per pound per minute or 10 minutes per pound.

Stage 2 (final) elapsed time. 40 minutes.

Total time 43 minutes.

Example No. 2:

5-hour working period at 24 pounds gage.

Decompression Table No. 1:

24 pounds for 5 hours, total decompression time. 117 minutes.

Decompression Table No. 2:

Stage 1: Reduce pressure from 24 pounds to 8 pounds at the uniform rate of 5 pounds per minute.

Elapsed time stage 1: 16/5 3 minutes.

Stage 2: Reduce pressure at a uniform rate from 8 pounds to 4 pounds over a period of 4 minutes. Rate, 1 pound per minute elapsed time, stage 2 4 minutes.

Transfer person to special decompression chamber maintaining the 4-pound pressure during the transfer operation.

Stage 3 (final stage): In the special decompression chamber, reduce the pressure at a uniform rate from 4 pounds to 0-pound gage over a period of 110 minutes. Rate, 0.037 pound per minute or 27.5 minutes per pound. Stage 3 (final) elapsed time. 110 minutes.

Total time 117 minutes.

DECOMPRESSION TABLE NO. 1
TABLE DECOMPRESSION TIME

Work pressure p.s.i.g.	Working period hours										
	1/2	1	1 1/2	2	3	4	5	6	7	8	Over 8
0-12	3	3	3	3	3	3	3	3	3	3	3
14	6	6	6	6	6	6	6	6	16	16	33
16	7	7	7	7	7	7	17	33	48	48	62
18	7	7	7	8	11	17	48	63	63	73	87
20	7	7	8	15	15	43	63	73	83	103	113
22	9	9	16	24	38	68	93	103	113	128	133
24	11	12	23	27	52	92	117	122	127	137	151
26	13	14	29	34	69	104	126	141	142	142	163
28	15	23	31	41	98	127	143	153	153	165	183
30	17	28	38	62	105	143	165	168	178	188	204
32	19	35	43	85	126	163	178	193	203	213	226
34	21	39	58	98	151	178	195	218	223	233	248
36	24	44	63	113	170	198	223	233	243	253	273
38	28	49	73	128	178	203	223	238	253	263	278
40	31	49	84	143	183	213	233	248	258	278	288
42	37	56	102	144	189	215	245	260	263	268	293
44	43	64	118	154	199	234	254	264	269	269	293
46	44	74	139	171	214	244	269	274	289	299	318
48	51	89	144	189	229	269	299	309	319	319	...
50	58	94	164	209	249	279	309	329	...	...	...

DECOMPRESSION TABLE NO. 2

(Do not interpolate, use next higher value for conditions not computed.)

Working chamber pressure P.s.i.g.	Working period Hours	Stage No.	Decompression data				
			Pressure reduction P.s.i.g.		Time in stage Minutes Min/Pound	Pressure reduction rate	Total time decompress Minutes
			From	To			
14	1/2	1	14	4	2	0.20	6
		2	4	0	4	1.00	6
1		1	14	4	2	0.20	6
		2	4	0	4	1.00	6
1 1/2		1	14	4	2	0.20	6
		2	4	0	4	1.00	6
2		1	14	4	2	0.20	6
		2	4	0	4	1.00	6
3		1	14	4	2	0.20	6
		2	4	0	4	1.00	6
4		1	14	0	2	0.20	6
		2	4	0	4	1.00	6
5		1	14	4	2	0.20	6
		2	4	0	4	1.00	6
6		1	14	4	2	0.20	6
		2	4	0	4	1.00	6
7		1	14	4	2	0.20	6
		2	4	0	14	3.50	16
8		1	14	4	2	0.20	6
		2	4	0	14	3.50	16
Over 8		1	14	4	2	0.20	6
		2	4	0	30	7.50	32
16	1/2	1	16	4	3	0.20	7
		2	4	0	4	1.00	7
1		1	16	4	3	0.20	7
		2	4	0	4	1.00	7
1 1/2		1	16	4	3	0.20	7
		2	4	0	4	1.00	7
2		1	16	4	3	0.20	7
		2	4	0	4	1.00	7
3		1	16	4	3	0.20	7
		2	4	0	4	1.00	7
4		1	14	4	3	0.20	7
		2	4	0	4	1.00	7
5		1	14	4	3	0.20	7
		2	4	0	4	3.50	17
6		1	14	4	3	0.20	7
		2	4	0	30	7.50	33
7		1	14	4	3	0.20	7
		2	4	0	45	11.25	48
8		1	14	4	3	0.20	7
		2	4	0	45	11.25	48
Over 8		1	14	4	3	0.20	7
		2	4	0	60	15.00	63
18	1/2	1	18	4	3	0.20	7
		2	4	0	4	1.00	7
1		1	18	4	3	0.20	7
		2	4	0	4	1.00	7
1 1/2		1	18	4	3	0.20	7
		2	4	0	4	1.00	7
2		1	18	4	3	0.20	7
		2	4	0	5	1.25	8
3		1	18	4	3	0.20	7
		2	4	0	8	2.00	11
4		1	18	4	3	0.20	7
		2	4	0	14	3.50	17
5		1	18	4	3	0.20	7
		2	4	0	45	11.25	48
6		1	18	4	3	0.20	7
		2	4	0	60	15.00	63
7		1	18	4	3	0.20	7
		2	4	0	60	15.00	63
8		1	18	4	3	0.20	7
		2	4	0	70	17.50	73
Over 8		1	18	4	3	0.20	7
		2	4	0	84	21.00	87
20	1/2	1	20	4	3	0.20	7
		2	4	0	4	1.00	7
1		1	20	4	3	0.20	7
		2	4	0	4	1.00	7
1 1/2		1	20	4	3	0.20	7

2		1	20	4	0	4	0	5	1.25	8
		2	4	0	12	3	0	3	0.20	
3		1	20	4	0	4	0	12	3.00	15
		2	4	0	12	3	0	3	0.20	
4		1	20	4	0	4	0	12	3.00	15
		2	4	0	40	3	0	3	0.20	
5		1	20	4	0	4	0	40	10.00	43
		2	4	0	60	3	0	3	0.20	
6		1	20	4	0	4	0	60	15.00	63
		2	4	0	70	3	0	3	0.20	
7		1	20	4	0	4	0	70	17.50	73
		2	4	0	80	3	0	3	0.20	
8		1	20	4	0	4	0	80	20.00	83
		2	4	0	100	3	0	3	0.20	
Over 8		1	20	4	0	4	0	100	25.00	103
		2	4	0	110	3	0	3	0.20	
22	1/2	1	22	6	0	6	0	6	27.50	113
		2	6	0	6	0	6	3	0.20	
1		1	22	6	0	6	0	6	1.00	9
		2	6	0	6	0	6	3	0.20	
1 1/2		1	22	6	0	6	0	6	1.00	9
		2	6	0	13	3	0	3	0.20	
2		1	22	6	0	6	0	13	2.20	16
		2	6	0	21	3	0	3	0.20	
3		1	22	6	0	6	0	21	3.50	24
		2	6	0	35	3	0	3	0.20	
4		1	22	6	0	6	0	35	5.85	38
		2	6	0	65	3	0	3	0.20	
5		1	22	6	0	6	0	65	10.83	68
		2	6	0	90	3	0	3	0.20	
6		1	22	6	0	6	0	90	15.00	93
		2	6	0	100	3	0	3	0.20	
7		1	22	6	0	6	0	100	16.67	103
		2	6	0	110	3	0	3	0.20	
8		1	22	6	0	6	0	110	18.35	113
		2	6	0	125	3	0	3	0.20	
Over 8		1	22	6	0	6	0	125	20.80	128
		2	6	0	130	3	0	3	0.20	
24	1/2	1	24	8	0	8	0	8	21.70	133
		2	8	0	4	4	0	4	0.20	
1		1	24	8	0	8	0	4	1.00	11
		2	8	0	4	4	0	4	1.00	
1 1/2		1	24	8	0	8	0	4	1.25	12
		2	8	0	5	3	0	3	0.20	
2		1	24	8	0	8	0	5	1.00	
		2	8	0	16	3	0	3	0.20	
3		1	24	8	0	8	0	16	4.00	23
		2	8	0	20	3	0	3	0.20	
4		1	24	8	0	8	0	20	5.00	27
		2	8	0	24	3	0	3	0.20	
5		1	24	8	0	8	0	24	7.00	31
		2	8	0	30	3	0	3	0.20	
6		1	24	8	0	8	0	30	8.00	35
		2	8	0	36	3	0	3	0.20	
7		1	24	8	0	8	0	36	10.00	39
		2	8	0	42	3	0	3	0.20	
8		1	24	8	0	8	0	42	12.00	43
		2	8	0	48	3	0	3	0.20	
Over 8		1	24	8	0	8	0	48	16.00	47
		2	8	0	54	3	0	3	0.20	
26	1/2	1	26	10	0	10	0	10	25.00	103
		2	10	0	4	6	0	6	1.00	
1		1	26	10	0	10	0	4	1.00	13
		2	10	0	4	6	0	6	1.00	
1 1/2		1	26	10	0	10	0	4	1.25	14
		2	10	0	5	3	0	3	0.20	
2		1	26	10	0	10	0	5	1.00	
		2	10	0	6	3	0	3	0.20	
3		1	26	10	0	10	0	6	1.00	
		2	10	0	7	3	0	3	0.20	
3		1	26	10	0	10	0	7	1.00	
		2	10	0	8	3	0	3	0.20	
3		1	26	10	0	10	0	8	1.00	
		2	10	0	9	3	0	3	0.20	
3		1	26	10	0	10	0	9	1.00	
		2	10	0	10	3	0	3	0.20	
3		1	26	10	0	10	0	10	1.00	
		2	10	0	11	3	0	3	0.20	
3		1	26	10	0	10	0	11	1.00	
		2	10	0	12	3	0	3	0.20	
3		1	26	10	0	10	0	12	1.00	
		2	10	0	13	3	0	3	0.20	
3		1	26	10	0	10	0	13	1.00	
		2	10	0	14	3	0	3	0.20	
3		1	26	10	0	10	0	14	1.00	
		2	10	0	15	3	0	3	0.20	
3		1	26	10	0	10	0	15	1.00	
		2	10	0	16	3	0	3	0.20	
3		1	26	10	0	10	0	16	1.00	
		2	10	0	17	3	0	3	0.20	
3		1	26	10	0	10	0	17	1.00	
		2	10	0	18	3	0	3	0.20	
3		1	26	10	0	10	0	18	1.00	
		2	10	0	19	3	0	3	0.20	
3		1	26	10	0	10	0	19	1.00	
		2	10	0	20	3	0	3	0.20	
3		1	26	10	0	10	0	20	1.00	
		2	10	0	21	3	0	3	0.20	
3		1	26	10	0	10	0	21	1.00	
		2	10	0	22	3	0	3	0.20	
3		1	26	10	0	10	0	22	1.00	
		2	10	0	23	3	0	3	0.20	
3		1	26	10	0	10	0	23	1.00	
		2	10	0	24	3	0	3	0.20	
3		1	26	10	0	10	0	24	1.00	
		2	10	0	25	3	0	3	0.20	
3		1	26	10	0	10	0	25	1.00	
		2	10	0	26	3	0	3	0.20	
3		1	26	10	0	10	0	26	1.00	
		2	10	0	27	3	0	3	0.20	
3		1	26	10	0	10	0	27	1.00	
		2	10	0	28	3				

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	2	10	4	6	1.00				3	4	0	130	32.50	204	
	3	4	0	60	15.00	69	32	1/2	1	32	16	3	0.20		
4	1	26	10	3	0.20				2	16	4	12	1.00		
	2	10	4	6	1.0				3	4	0	4	1.00	19	
	3	4	0	95	23.75	104			1	32	16	3	0.20		
5	1	26	10	3	0.20				2	16	4	12	1.00		
	2	10	4	8	1.33				3	4	0	20	5.00	35	
	3	4	0	115	28.80	126			1 1/2	1	32	16	3	0.20	
6	1	26	10	3	0.20				2	16	4	15	1.25		
	2	10	4	8	1.33				3	4	0	25	6.25	43	
	3	4	0	130	32.50	141			2	16	4	22	1.83		
7	1	26	10	3	0.20				3	4	0	60	15.00	85	
	2	10	4	9	1.50				1	32	16	3	0.20		
	3	4	0	130	32.50	142			2	16	4	28	2.33		
8	1	26	10	3	0.20				3	4	0	95	23.75	126	
	2	10	4	9	1.50				2	16	4	40	3.33		
	3	4	0	130	32.50	142			4	30	4	120	30.00	163	
Over 8	1	26	10	3	0.20				1	32	16	3	0.20		
	2	10	4	30	5.00				2	16	4	45	3.75		
	3	4	0	130	32.50	163			5	32	16	3	0.20		
28	1/2	1	28	12	3	0.20			2	16	4	4	130	32.50	178
	2	12	4	8	1.00				3	4	0	130	32.50	178	
	3	4	0	4	1.00	15			6	32	16	3	0.20		
1	1	28	12	3	0.20				2	16	4	60	5.00		
	2	12	4	8	1.00				3	4	0	130	32.50	193	
	3	4	0	12	3.00	23			7	32	16	3	0.20		
1 1/2	1	28	12	3	0.20				2	16	4	70	5.83		
	2	12	4	8	1.00				3	4	0	130	32.50	203	
	3	4	0	20	5.00	31			8	32	16	3	0.20		
2	1	28	12	3	0.20				2	16	4	80	6.67		
	2	12	4	8	1.00				3	4	0	130	32.50	213	
	3	4	0	30	7.50	41			Over 8	1	32	16	3	0.20	
3	1	28	12	3	0.20				2	16	4	93	7.75		
	2	12	4	10	1.25				3	4	0	130	32.50	226	
	3	4	0	85	21.20	98			34	1/2	1	34	18	3	0.20
4	1	28	12	3	0.20				2	18	4	14	1.00		
	2	12	4	14	1.75				3	4	0	4	1.00	21	
	3	4	0	110	27.50	127			1	34	18	3	0.20		
5	1	28	12	3	0.20				2	18	4	14	1.00		
	2	12	4	20	2.50				3	4	0	22	5.50	39	
	3	4	0	120	30.00	143			1 1/2	1	34	18	3	0.20	
6	1	28	12	3	0.20				2	18	4	25	1.80		
	2	12	4	20	2.50				3	4	0	30	7.50	58	
	3	4	0	130	32.50	153			2	18	4	35	2.50		
7	1	28	12	3	0.20				3	4	0	60	15.00	98	
	2	12	4	20	2.50				2	18	4	3	0.20		
	3	4	0	130	32.50	153			3	34	18	3	0.20		
8	1	28	12	3	0.20				2	18	4	43	3.10		
	2	12	4	32	4.00				3	4	0	105	26.25	151	
	3	4	0	130	32.50	165			4	34	18	3	0.20		
Over 8	1	28	12	3	0.20				2	18	4	55	3.93		
	2	12	4	50	6.25				3	4	0	120	30.00	178	
	3	4	0	130	32.50	183			5	34	18	3	0.20		
30	1/2	1	30	14	3	0.20			2	18	4	62	4.43		
	2	14	4	10	1.00				3	4	0	130	32.50	195	
	3	4	0	4	1.00	17			6	34	18	3	0.20		
1	1	30	14	3	0.20				2	18	4	85	6.07		
	2	14	4	10	1.00				3	4	0	130	32.50	218	
	3	4	0	15	3.75	28			7	34	18	3	0.20		
1 1/2	1	30	14	3	0.20				2	18	4	90	6.43		
	2	14	4	10	1.00				3	4	0	130	32.50	223	
	3	4	0	25	6.25	38			8	34	18	3	0.20		
2	1	30	14	3	0.20				2	18	4	100	7.15		
	2	14	4	14	1.40				3	4	0	130	32.50	233	
	3	4	0	45	11.25	62			Over 8	1	34	18	3	0.20	
3	1	30	14	3	0.20				2	18	4	115	8.23		
	2	14	4	17	1.70				3	4	0	130	32.50	248	
	3	4	0	85	21.20	105			36	1/2	1	36	20	3	0.20
4	1	30	14	3	0.20				2	20	4	16	1.00		
	2	14	4	30	3.00				3	4	0	5	1.25	24	
	3	4	0	110	27.50	143			1	36	20	3	0.20		
5	1	30	14	3	0.20				2	20	4	16	1.00		
	2	14	4	35	3.50				3	4	0	25	6.25	44	
	3	4	0	130	32.50	165			1 1/2	1	36	20	3	0.20	
6	1	30	14	3	0.20				2	20	4	30	1.88		
	2	14	4	35	3.50				3	4	0	30	7.50	63	
	3	4	0	130	32.50	168			2	20	4	3	0.20		
7	1	30	14	3	0.20				3	4	0	70	17.50	113	
	2	14	4	45	4.50				2	20	4	40	2.50		
	3	4	0	130	32.50	178			3	36	20	3	0.20		
8	1	30	14	3	0.20				2	20	4	52	3.25		
	2	14	4	55	5.50				3	4	0	115	28.75	170	
	3	4	0	130	32.50	188			4	36	20	3	0.20		
Over 8	1	30	14	3	0.20				2	20	4	65	4.06		
	2	14	4	71	7.10				3	4	0	130	32.50	198	

5	1	36	20	3	0.20		2	24	8	75	4.70				
	2	20	4	90	5.63		3	8	4	60	15.00				
	3	4	0	130	32.50	223	4	4	0	130	32.50	268			
6	1	36	20	3	0.20		Over 8	1	40	24	3	0.20			
	2	20	4	100	6.25			2	24	8	95	5.93			
	3	4	0	130	32.50	233		3	8	4	60	15.00			
7	1	36	20	3	0.20			4	4	0	130	32.50	288		
	2	20	4	110	6.88		42	1/2	1	42	26	3	0.20		
	3	4	0	130	32.50	243			2	26	10	16	1.00		
8	1	36	20	3	0.20				3	10	4	6	1.00		
	2	20	4	120	7.50				4	4	0	12	3.00	37	
	3	4	0	130	32.50	253			1	42	26	3	0.20		
Over 8	1	36	20	3	0.20				2	26	10	16	1.00		
	2	20	4	140	8.75				3	10	4	12	2.00		
	3	4	0	130	32.50	273			4	4	0	25	6.25	56	
38	1/2	38	22	3	0.20				1	42	26	3	0.20		
	2	22	6	16	1.00				2	26	10	16	1.00		
	3	6	0	9	1.50	28			3	10	4	23	3.83		
1	1	38	22	3	0.20				4	4	0	60	15.00	102	
	2	22	6	16	1.00				1	42	26	3	0.20		
	3	6	0	30	5.00	49			2	26	10	16	1.00		
1 1/2	1	38	22	3	0.20				3	10	4	30	5.00		
	2	22	6	20	1.25				4	4	0	95	23.75	144	
	3	6	0	50	8.34	73			1	42	26	3	0.20		
2	1	38	22	3	0.20				2	26	10	16	1.00		
	2	22	6	30	1.88				3	10	4	50	8.34		
	3	6	0	95	15.83	128			4	4	0	120	30.00	189	
3	1	38	22	3	0.20				1	42	26	3	0.20		
	2	22	6	35	2.19				2	26	10	17	1.06		
	3	6	0	140	23.35	178			3	10	4	65	10.83		
4	1	38	22	3	0.20				4	4	0	130	32.50	215	
	2	22	6	50	3.12				1	42	26	3	0.20		
	3	6	0	150	25.00	203			2	26	10	27	1.69		
5	1	38	22	3	0.20				3	10	4	85	14.18		
	2	22	6	55	3.44				4	4	0	130	32.50	245	
	3	6	0	165	27.50	223			1	42	26	3	0.20		
6	1	28	22	3	0.20				2	26	10	27	1.69		
	2	22	6	70	4.38				3	10	4	100	16.67		
	3	6	0	165	27.50	238			4	4	0	130	32.50	260	
7	1	38	22	3	0.20				1	42	26	3	0.20		
	2	22	6	85	5.32				2	26	10	30	1.88		
	3	6	0	165	27.50	253			3	10	4	100	16.67		
8	1	38	22	3	0.20				4	4	0	130	32.50	263	
	2	22	6	95	5.93				1	42	26	3	0.20		
	3	6	0	165	27.50	263			2	26	10	35	2.19		
Over 8	1	38	22	3	0.20				3	10	4	100	16.67		
	2	22	6	110	6.88				4	4	0	130	32.50	268	
	3	6	0	165	27.50	278			Over 8	1	42	26	3	0.20	
40	1/2	40	24	3	0.20				2	26	10	60	3.75		
	2	24	8	16	1.00				3	10	4	100	16.67		
	3	8	4	4	1.00				4	4	0	130	32.50	293	
	4	4	0	8	2.00	31			1	44	28	3	0.20		
1	1	40	24	3	0.20				2	28	12	16	1.00		
	2	24	8	16	1.00				3	12	4	8	1.00		
	3	8	4	5	1.25				4	4	0	16	4.00	43	
	4	4	0	25	6.25	49			1	44	28	3	0.20		
1 1/2	1	40	24	3	0.20				2	28	12	16	1.00		
	2	24	8	16	1.00				3	12	4	20	2.50		
	3	8	4	20	5.00				4	4	0	25	6.25	64	
	4	4	0	45	11.25	84			1 1/2	1	44	28	3	0.20	
2	1	40	24	3	0.20				2	28	12	16	1.00		
	2	24	8	25	1.56				3	12	4	27	3.38		
	3	8	4	20	5.00				4	4	0	72	18.00	118	
	4	4	0	95	23.75	143			1	44	28	3	0.20		
3	1	40	24	3	0.20				2	28	12	16	1.00		
	2	24	8	30	1.88				3	12	4	40	5.00		
	3	8	4	30	7.50				4	4	0	95	23.75	154	
	4	4	0	120	30.00	183			1	44	28	3	0.20		
4	1	40	24	3	0.20				2	28	12	16	1.00		
	2	24	8	45	2.81				3	12	4	60	7.50		
	3	8	4	35	8.75				4	4	0	120	30.00	199	
	4	4	0	130	32.50	213			1	44	28	3	0.20		
5	1	40	24	3	0.20				2	28	12	16	1.00		
	2	24	8	47	2.94				3	12	4	85	10.62		
	3	8	4	53	13.25				4	4	0	130	32.50	234	
	4	4	0	130	32.50	233			1	44	28	3	0.20		
6	1	40	24	3	0.20				2	28	12	16	1.00		
	2	24	8	55	3.44				3	12	4	105	13.13		
	3	8	4	60	15.00				4	4	0	130	32.50	254	
	4	4	0	130	32.50	248			1	44	28	3	0.20		
7	1	40	24	3	0.20				2	28	12	16	1.00		
	2	24	8	65	4.06				3	12	4	115	14.38		
	3	8	4	60	15.00				4	4	0	130	32.50	264	
	4	4	0	130	32.50	258			1	44	28	3	0.20		
8	1	40	24	3	0.20				2	28	12	16	1.00		

	3	12	4	120	15.00	
	4	4	0	130	32.50	269
8	1	44	28	3	0.20	
	2	28	12	16	1.00	
	3	12	4	120	15.00	
	4	4	0	130	32.50	269
Over 8	1	44	28	3	0.20	
	2	28	12	40	2.50	
	3	12	4	120	15.00	
	4	4	0	130	32.50	293
46 .. 1/2	1	46	30	3	0.20	
	2	30	14	16	1.00	
	3	14	4	10	1.00	
	4	4	0	15	3.75	44
1	1	46	30	3	0.20	
	2	30	14	16	1.00	
	3	14	4	25	2.50	
	4	4	0	30	7.50	74
1 1/2	1	46	30	3	0.20	
	2	30	14	16	1.00	
	3	14	4	35	3.50	
	4	4	0	85	21.20	139
2	1	46	30	3	0.20	
	2	30	14	16	1.00	
	3	14	4	47	4.70	
	4	4	0	105	26.25	171
3	1	46	30	3	0.20	
	2	30	14	16	1.00	
	3	14	4	65	6.50	
	4	4	0	130	32.50	214
4	1	46	30	3	0.20	
	2	30	14	16	1.00	
	3	14	4	95	9.50	
	4	4	0	130	32.50	244
5	1	46	30	3	0.20	
	2	30	14	16	1.00	
	3	14	4	120	12.00	
	4	4	0	130	32.50	269
6	1	46	30	3	0.20	
	2	30	14	16	1.00	
	3	14	4	125	12.50	
	4	4	0	130	32.50	274
7	1	46	30	3	0.20	
	2	30	14	16	1.00	
	3	14	4	140	14.00	
	4	4	0	130	32.50	289
8	1	46	30	3	0.20	
	2	30	14	16	1.00	
	3	14	4	150	15.00	
	4	4	0	130	32.50	299
Over 8	1	46	30	3	0.20	
	2	30	14	25	1.56	
	3	14	4	160	16.00	
	4	4	0	130	32.50	318
48 .. 1/2	1	48	32	3	0.20	
	2	32	16	16	1.00	
	3	16	4	12	1.00	
	4	4	0	20	5.00	51
1	1	48	32	3	0.20	
	2	32	16	16	1.00	
	3	16	4	35	2.92	
	4	4	0	35	8.75	89
1 1/2	1	48	32	3	0.20	
	2	32	16	16	1.00	
	3	16	4	45	3.75	
	4	4	0	80	20.00	144
2	1	48	32	3	0.20	
	2	32	16	16	1.00	
	3	16	4	60	5.00	
	4	4	0	110	27.50	189
3	1	48	32	3	0.20	
	2	32	16	16	1.00	
	3	16	4	90	7.50	
	4	4	0	120	30.00	229
4	1	48	32	3	0.20	
	2	32	16	16	1.00	
	3	16	4	120	10.00	
	4	4	0	130	32.50	269
5	1	48	32	3	0.20	
	2	32	16	16	1.00	
	3	16	4	140	11.67	
	4	4	0	130	32.50	299
6	1	48	32	3	0.20	
	2	32	16	16	1.00	
	3	16	4	160	13.33	

	4	4	0	130	32.50	309
7	1	48	32	3	0.20	
	2	32	16	16	1.00	
	3	16	4	170	14.17	
	4	4	0	130	32.50	319
8	1	48	32	3	0.20	
	2	32	16	16	1.00	
	3	16	4	170	14.17	
	4	4	0	130	32.50	319
50 .. 1/2	1	50	34	3	0.20	
	2	34	18	16	1.00	
	3	18	4	14	1.00	
	4	4	0	25	6.25	58
1	1	50	34	3	0.20	
	2	34	18	16	1.00	
	3	18	4	40	2.86	
	4	4	0	35	8.75	94
1 1/2	1	50	34	3	0.20	
	2	34	18	16	1.00	
	3	18	4	55	3.93	
	4	4	0	90	22.50	164
2	1	50	34	3	0.20	
	2	34	18	16	1.00	
	3	18	4	70	5.00	
	4	4	0	120	30.00	209
3	1	50	34	3	0.20	
	2	34	18	16	1.00	
	3	18	4	100	7.15	
	4	4	0	130	32.50	249
4	1	50	34	3	0.20	
	2	34	18	16	1.00	
	3	18	4	130	8.58	
	4	4	0	130	32.50	279
5	1	50	34	3	0.20	
	2	34	18	16	1.00	
	3	18	4	160	11.42	
	4	4	0	130	32.50	309
6	1	50	34	3	0.20	
	2	34	18	16	1.00	
	3	18	4	180	12.85	
	4	4	0	130	32.50	329

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-74501, filed 7/20/94, effective 9/20/94; Order 74-26, § 296-155-745 (part), Appendix A (codified as WAC 296-155-74501), filed 5/7/74, effective 6/6/74.]

**PART R
MISCELLANEOUS CONSTRUCTION
REQUIREMENTS**

WAC 296-155-755 Roofing, insulating and water-proofing. (1) Roofers hoisting jack shall be constructed to withstand the contemplated load to be hoisted. The beam from counter balance point to heel of jack shall be at least 3/4 the length of the entire beam.

(2) Hoisting jack shall be counterweighted with a minimum of three times the contemplated maximum load to be lifted. Counterweight shall be securely fastened to heel of jack to prevent displacement, or the jack shall be fastened by means of lashing, bolting, or other means to prevent displacement.

(3) A steel collar or U-bolt and shackle on head of the hoisting jack shall be provided for attachment of pulley.

(4) Hoisting pulleys shall be of steel construction.

(5) Where materials are hoisted by hand the hoist line shall be not less than five-eighths manila rope, or the equivalent. Where machine hoist is used the hoist line shall be wire rope.

(6) Hoisting hooks shall be of cast or forged steel heavy enough to prevent straightening under a load.

(7) Workers shall not stand under load when material or hot asphalt is being hoisted.

(8) Hot asphalt shall be kept at a safe level in buckets for carrying and hoisting.

(9) Service buckets of hot asphalt shall not be carried up ladders by workers.

(10) Service buckets shall be standard safety bucket or flatbottom bucket with bails fastened to an offset ear firmly riveted to side of bucket. There shall be a handle riveted near bottom of bucket for tipping purposes.

(11) Ladders shall extend at least 3 feet above the platform or roof served and shall be secured at top and bottom to prevent slipping.

(12) Safeguards shall be erected to prevent loads and lines contacting power lines where not possible to work in clear of power lines.

(13) Asphalt chunks shall not be thrown into hot tar pot, but shall be placed so as to prevent splashing of hot material.

(14) There shall be means to smother fires at fired tar pots.

(15) Mop or spud bar handles over three feet long shall be of wood or other nonconductive material.

(16) Persons working at kettles or handling hot tar shall wear gloves and have arms fully protected.

(17) Open tar heating pots shall be kept outside of buildings.

Note: Electric type tar heating equipment may be used inside of the working enclosure provided that exhaust fans in connection with tubing, either rigid or flexible, capable of carrying fumes created by the heating process to the outside air are installed and in constant use during heating operations. The equipment should be provided with hinged lid or baffle plate for the purpose of immediate smothering of a pot fire.

(18) While hot tar is being applied inside an enclosure, exhaust fans to supplement natural ventilation shall be installed to expedite removal of gaseous fumes from the building.

(19) Flame heated tar pots shall be prohibited on roofs of structures.

(20) Tar pots shall have an attendant at all times while in operation.

[Order 74-26, § 296-155-755, filed 5/7/74, effective 6/6/74.]

WAC 296-155-765 Rock crushing, gravel washing, and hot mix plants. (1) Stationary dragline machines shall have all moving parts which are exposed to contact guarded with standard safeguards.

(a) All running lines, straps, etc., shall be regularly inspected and shall be changed when 10% of the wires in a 3 foot length are broken.

(b) Spars shall be properly guyed with a minimum of 5 top guys and where spar is over 50 feet in height, 3 buckle guys shall be used.

(c) A pass line shall be rigged on the spar to provide safe means of reaching top of spar.

(d) The head block shall be equipped with a safety strap attached to shell of the block and onto a guy wire leading away from the working area.

(2) Truck dump bunkers shall have wheel bumper block installed when dumping material from trucks.

(3) Substantial walkways and working platforms, equipped with toe boards and handrails shall be installed at

all plants. Standard stairways and ladders shall be placed to reach all parts requiring oiling and maintenance.

(4) Plant structures shall be constructed to carry the required load, without material or structural failure, for the prescribed life of the material used.

(5) Bunker unloading devices shall be arranged to be operative from outside the walls of bunkers.

(6) Crusher operators and other employees working where hazardous dust or nuisance dust exists shall use approved respirators and goggles.

(7) All dusty rock crushing houses or other dusty places of employment, shall be equipped with means for controlling the dust.

(8) Cone type crushers shall be equipped with approved guards over or around the feed end to prevent rock from flying from crusher while in operation.

(9) All aggregate elevators, bucket or other type, shall have guards or barricades installed under or around return strand and of sufficient strength to sustain weight of piled up broken elevator equipment.

(10) All plant controls shall be placed so as to be readily accessible.

(11) Overhead conveyors shall be constructed so as to restrain the spillage of material. Wherever the hazard of falling materials exists, overhead protection shall be provided over walkways and roadways.

(12) Electrical equipment shall be installed and maintained to comply with the National Electrical Code.

(13) Exhaust fumes from internal combustion engines shall be discharged away from or above the working station.

(14) Hot mix plants, steam boilers and pressure vessels shall conform to A.S.M.E. Boiler and Pressure Vessel Codes and applicable rules and regulations of the department.

(15) All hot pipes exposed to contact shall be covered or otherwise guarded against contact.

(16) All oil tanks above ground shall be properly bedded and grounded.

(17) Oil leakage on the ground shall be cleaned up or covered with absorbent material.

(18) Mixer operators shall use approved respirator and goggles except when operating from a remote location.

(19) Dust and fume collection systems shall be provided on all installations. Dust and fumes shall be discharged back into plant or carried to a suitable distance from the work area and precipitated.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-765, filed 1/21/86; Order 74-26, § 296-155-765, filed 5/7/74, effective 6/6/74.]

WAC 296-155-770 Moving of structures. (1) When structures are being raised, lowered, temporarily held in position or moved laterally, care shall be exercised to prevent the possibility of mishap.

(2) Weights to be moved shall be carefully computed and equipment furnished to provide a safety factor of five.

(3) Where excavations exist they shall be shored in compliance with Part N of this chapter.

(4) Cribbing and blocking shall be set on a level and firm foundation.

(5) Dollies and rollers shall be securely blocked except when structure is being moved by power equipment.

(6) Jacks shall comply with WAC 296-155-375 of this chapter.

(7) Provisions shall be made to maintain a minimum clearance of 10 feet from all electrical conductors with the following exceptions:

(a) When a representative of the owner of the electrical conductors is present and directs the handling of all said conductors.

(b) Where there shall be existing and/or erected mechanical barriers to prevent contact of structure or workers with said electrical conductors. Barriers shall be installed by or under the direction of the owners of the conductors.

(c) Where said electrical conductors have been de-energized and grounded by the owners of the conductors.

(d) By relocation of said electrical conductors by the owners of the conductors. The 10 foot requirement shall not be reduced by movement due to strains being imposed upon the conductors or the structures supporting the conductors or upon any fixtures or attachments thereon.

(8) When a structure is being lifted, shoring shall be provided at all times and be kept up to the object until the desired height is reached, and then it shall be blocked or cribbed immediately.

(9) Timbers must be in sound condition and of a size sufficient to maintain not more than one inch deflection for each 200 inches of unsupported span.

(10) The cross member used on the front dolly, or the fifth wheel on the truck, must be of construction and size to preclude any deflection. All floor joists of the building being moved must be firmly supported on either the running members or on the cross members, which in turn ride on or are firmly attached to the running members.

(11) When timbers are used as the cross member, a steel saddle or cradle shall be used which will distribute the load evenly over the cross members, which in turn ride on or are firmly attached to the running members.

(12) When timbers are used as the cross member, a steel saddle or cradle shall be used which will distribute the load evenly over the cross sectional area of said timber where the timber is supported over the dolly or fifth wheel. This saddle or cradle shall be equipped so as to be interchangeable on any standard fifth wheel when such operation is used. Cross members of any other material used on fifth wheel loading shall also be so equipped.

(13) When running members are secured to the lower side of the cross member supported by the fifth wheel or front dolly, the primary support shall be 3/4 inch steel bolts placed one on either side of each member and spaced from such members by 1/2 inch steel plate shaped to act as a template for placement on the top of the cross member and beneath the running member. 3/4 by 3" nuts shall be used to tighten the above described clamp in a secure fashion. A secondary binding of chain or cable with chain binder or jacks shall be used to securely fasten the running members to cross members.

Note: Chains or cables securely tightened can be used. A secondary chain or safety chain should also be used in the event that the main chain should snap.

(14) Safety chains shall be used between the running members and the towing truck to supplant the tow bar, and will be secured so as to preclude any possibility of the

running timbers being pulled off the cross members on the truck or from the dollies.

(15) For the purpose of computing weights to determine the axle and tire loadings, the cubic volume of the building (length, width and height), including walls, floors and ceiling joists, shall be used, allowing five pounds per cubic foot. This method of computing weight shall be used to determine if larger equipment need be employed on any given move.

(16) When fastening structures to tractor, and runners are clamped to headers, steel chains or the equivalent shall be used. If steel chains are used, said chains shall be tightened by railroad jacks or the equivalent.

(17) All motor vehicles shall conform with motor vehicle laws of the state of Washington.

(18) A fifth wheel type suspension with two nonsteering dollies shall be acceptable for moving buildings which do not exceed 46 feet in length. Permission to move larger structures with this type of suspension shall be obtained from the department.

(19) Pushing from the rear shall be prohibited unless a system of signals is used to control the driver.

(20) Blocks capable of holding the unit being moved shall be carried, and in case of winching operations, shall be kept close to the downhill side of the wheel of each dolly to prevent a runaway should the cable slip.

[Order 74-26, § 296-155-770, filed 5/7/74, effective 6/6/74.]

PART S DEMOLITION

WAC 296-155-775 Preparatory operations. (1) Prior to permitting employees to start demolition operations, an engineering survey shall be made, by a competent person, of the structure to determine structural integrity and the possibility of unplanned collapse of any portion of the structure. Any adjacent structure where employees may be exposed shall also be similarly checked. The employer shall have in writing, evidence that such a survey has been performed.

(2) A copy of the survey report and of the plans and/or methods of operations shall be maintained at the job site for the duration of the demolition operation.

(3) Any device or equipment such as scaffolds, ladders, derricks, hoists, etc., used in connection with demolition work shall be constructed, installed, inspected, maintained and operated in accordance with the regulations governing the construction, installation, inspection, maintenance and operation of such device or equipment as specified in other parts of this chapter.

(4) Federal and state codes, safety standards, rules, regulations, and ordinances governing any and all phases of demolition work shall be observed at all times.

(5) Demolition of all buildings and structures shall be conducted under competent supervision, and safe working conditions shall be afforded the employees.

(6) When employees are required to work within a structure to be demolished which has been damaged by fire, flood, explosion, or other cause, the walls or floor shall be shored or braced.

(7) All electric, gas, water, steam, sewer, and other service lines shall be shut off, capped, or otherwise con-

trolled, outside the building line before demolition work is started. In each case, any utility company which is involved shall be notified in advance.

(8) If it is necessary to maintain any power, water or other utilities during demolition, such lines shall be temporarily relocated, as necessary, and protected.

(9) It shall be determined whether asbestos, hazardous materials, hazardous chemicals, gases, explosives, flammable materials, or similarly dangerous substances are present at the work site. When the presence of any such substance is apparent or suspected, testing and removal or purging shall be performed and the hazard eliminated before demolition is started. Removal of such substances shall be in accordance with the requirements of chapters 296-62 and 296-65 WAC.

(10) Where a hazard exists from fragmentation of glass, such hazards shall be removed.

(11) Where a hazard exists to employees falling through wall openings, the opening shall be protected to a height of between thirty-six and forty-two inches.

(12) When debris is dropped without the use of chutes, the area onto which the material is dropped shall be completely enclosed with barricades not less than forty-two inches high and not less than twenty feet back from the projected edge of the opening above. Signs, warning of the hazard of falling materials, shall be posted at each level. Removal shall not be permitted in this lower area until debris handling ceases above.

(13) All floor openings, not used as material drops, shall be covered over with material substantial enough to support the weight of any load which may be imposed. Such material shall be properly secured to prevent its accidental movement.

(14) Except for the cutting of holes in floors for chutes, holes through which to drop materials, preparation of storage space, and similar necessary preparatory work, the demolition of exterior walls and floor construction shall begin at the top of the structure and proceed downward. Each story of exterior wall and floor construction shall be removed and dropped into the storage space before commencing the removal of exterior walls and floors in the story next below.

(15) Workers shall not be permitted to carry on a demolition operation which will expose persons working on a lower level to danger.

(16) Employee entrances to multistory structures being demolished shall be completely protected by sidewalk sheds or canopies, or both, providing protection from the face of the building for a minimum of eight feet. All such canopies shall be at least two feet wider than the building entrances or openings (one foot wider on each side thereof), and shall be capable of sustaining a load of one hundred fifty pounds per square foot.

(17) Protruding nails in boards, planks and timber shall be withdrawn, driven in or bent over as soon as the same is removed from the structure being demolished.

(18) Any material to be removed which will cause dust to be formed, shall be sprinkled with water to lay the dust incidental to its removal.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-775, filed 7/20/94, effective 9/20/94; 87-24-051 (Order 87-24), § 296-155-775, filed 11/30/87. Statutory Authority: RCW 49.17.050(2) and 49.17.040. 87-10-008 (Order 87-06), § 296-155-775, filed 4/27/87. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-

14), § 296-155-775, filed 1/21/86; Order 74-26, § 296-155-775, filed 5/7/74, effective 6/6/74.]

WAC 296-155-780 Stairs, passageways, and ladders.

(1) Only those stairways, passageways, and ladders, designated as means of access to the structure of building, shall be used. Other access ways shall be entirely closed off at all times.

(2) All stairs, passageways, ladders and incidental equipment thereto, which are covered by this section, shall be periodically inspected and maintained in a clean safe condition.

(3) All ladders shall be secured in position.

(4) In a multistory building, when a stairwell is being used, it shall be properly illuminated by either natural or artificial means, and completely and substantially covered over at a point not less than two floors below the floor on which work is being performed. Access to the floor where the work is in progress shall be through a properly lighted, protected, and separate passageway.

[Order 74-26, § 296-155-780, filed 5/7/74, effective 6/6/74.]

WAC 296-155-785 Chutes. (1) No material shall be dropped to any point lying outside the exterior walls of the structure unless the area is effectively protected.

(2) All materials chutes, or sections thereof, at an angle of more than 45° from the horizontal, shall be entirely enclosed, except for openings equipped with closures at or about floor level for the insertion of materials. The openings shall not exceed 48 inches in height measured along the wall of the chute. At all stories below the top floor, such openings shall be kept closed when not in use.

(3) A substantial gate shall be installed in each chute at or near the discharge end. A competent employee shall be assigned to control the operation of the gate, and the backing and loading of trucks.

(4) When operations are not in progress, the area surrounding the discharge end of a chute shall be securely closed off.

(5) Any chute opening, into which workers dump debris, shall be protected by a substantial guardrail between 36 and 42 inches above the floor or other surface on which the employees stand to dump the material. Any space between the chute and the edge of openings in the floors through which it passes shall be solidly covered over.

(6) Where the material is dumped from mechanical equipment or wheelbarrows, a securely attached toeboard or bumper, not less than 4 inches thick and 6 inches high, shall be provided at each chute opening.

(7) Chutes shall be designed and constructed of such strength as to eliminate failure due to impact of materials or debris loaded therein.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-785, filed 7/20/94, effective 9/20/94; Order 74-26, § 296-155-785, filed 5/7/74, effective 6/6/74.]

WAC 296-155-790 Removal of materials through floor openings. Any openings cut in a floor for the disposal of materials shall be no larger in size than 25 percent of the aggregate of the total floor area, unless the lateral supports of the removed flooring remain in place. Floors weakened

or otherwise made unsafe by demolition operations shall be shored to carry safely the intended imposed load from demolition operations.

[Order 74-26, § 296-155-790, filed 5/7/74, effective 6/6/74.]

WAC 296-155-795 Removal of walls, masonry sections, and chimneys. (1) Masonry walls, or other sections of masonry, shall not be permitted to fall upon the floors of the building in such masses as to exceed the safe carrying capacities of the floors.

(2) No wall section, which is more than one story in height, shall be permitted to stand alone without lateral bracing, unless such wall was originally designed and constructed to stand without such lateral support, and is in a condition safe enough to be self-supporting. All walls shall be left in a stable condition at the end of each shift.

(3) Employees shall not be permitted to work on the top of a wall when weather conditions constitute a hazard.

(4) Structural or load-supporting members on any floor shall not be cut or removed until all stories above such a floor have been demolished and removed. This provision shall not prohibit the cutting of floor beams for the disposal of materials or for the installation of equipment, provided that the requirements of WAC 296-155-790 and 296-155-800 are met.

(5) Floor openings within 10 feet of any wall being demolished shall be planked solid, except when employees are kept out of the area below.

(6) In buildings of "skeleton-steel" construction, the steel framing may be left in place during the demolition of masonry. Where this is done, all steel beams, girders, and similar structural supports shall be cleared of all loose material as the masonry demolition progresses downward.

(7) Walkways or ladders shall be provided to enable employees to safely reach or leave any scaffold or wall.

(8) Walls, which serve as retaining walls to support earth or adjoining structures, shall not be demolished until such earth has been properly braced or adjoining structures have been properly underpinned.

(9) Walls, which are to serve as retaining walls against which debris will be piled, shall not be so used unless capable of safely supporting the imposed load.

[Order 74-26, § 296-155-795, filed 5/7/74, effective 6/6/74.]

WAC 296-155-800 Manual removal of floors. (1) Openings cut in a floor shall extend the full span of the arch between supports.

(2) Before demolishing any floor arch, debris and other material shall be removed from such arch and other adjacent floor area. Planks not less than 2 inches by 10 inches in cross section, full size undressed, shall be provided for, and shall be used by employees to stand on while breaking down floor arches between beams. Such planks shall be so located as to provide a safe support for the workers should the arch between the beams collapse. The open space between planks shall not exceed 16 inches.

(3) Safe walkways, not less than 18 inches wide, formed of planks not less than 2 inches thick if wood, or of equivalent strength if metal, shall be provided and used by workers when necessary to enable them to reach any point without walking upon exposed beams.

(1997 Ed.)

(4) Stringers of ample strength shall be installed to support the flooring planks, and the ends of such stringers shall be supported by floor beams or girders, and not by floor arches alone.

(5) Planks shall be laid together over solid bearings with the ends overlapping at least 1 foot.

(6) When floor arches are being removed, employees shall not be allowed in the area directly underneath, and such an area shall be barricaded to prevent access to it.

(7) Demolition of floor arches shall not be started until they, and the surrounding floor area for a distance of 20 feet, have been cleared of debris and any other unnecessary materials.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-800, filed 7/20/94, effective 9/20/94; Order 74-26, § 296-155-800, filed 5/7/74, effective 6/6/74.]

WAC 296-155-805 Removal of walls, floors, and material with equipment. (1) Mechanical equipment shall not be used on floors or working surfaces unless such floors or surfaces are of sufficient strength to support the imposed load.

(2) Floor openings shall have curbs or stop-logs to prevent equipment from running over the edge.

(3) Mechanical equipment used shall meet the requirements specified in parts L and M of this chapter.

[Order 74-26, § 296-155-805, filed 5/7/74, effective 6/6/74.]

WAC 296-155-810 Catch platforms. (1) During the demolition of the exterior walls of a structure originally more than seventy feet high, catch platforms shall be erected along the exterior faces of such walls where necessary to prevent injury to persons working below.

(2) Such catch platforms shall be constructed and maintained not more than three stories below the story from which the exterior walls are being removed, until the demolition has progressed to within three stories of the ground level.

(3) Catch platforms shall not be less than five feet in width measured in a horizontal distance from the face of the structure and constructed of outriggers and planks. Planks shall be laid tight together and without openings between the planks and the wall.

Note: Catch platforms may be constructed of other approved materials of equal strength and security against falling material.

(4) Catch platforms shall be capable of sustaining a uniform live load of not less than one hundred and twenty-five pounds per square foot.

[Order 74-26, § 296-155-810, filed 5/7/74, effective 6/6/74.]

WAC 296-155-815 Storage. (1) The storage of waste material and debris on any floor shall not exceed the allowable floor loads.

(2) In buildings having wooden floor construction, the flooring boards may be removed from not more than one floor above grade to provide storage space for debris, provided falling material is not permitted to endanger the stability of the structure.

(3) When wood floor beams serve to brace interior walls or free-standing exterior walls, such beams shall be left in

place until other equivalent support can be installed to replace them.

(4) Floor arches, to an elevation of not more than 25 feet above grade, may be removed to provide storage area for debris: Provided, That such removal does not endanger the stability of the structure.

(5) Storage space into which material is dumped shall be blocked off, except for openings necessary for the removal of material. Such openings shall be kept closed at all times when material is not being removed.

[Order 74-26, § 296-155-815, filed 5/7/74, effective 6/6/74.]

WAC 296-155-820 Removal of steel construction.

(1) When floor arches have been removed, planking in accordance with WAC 296-155-800(2) shall be provided for the workers engaged in razing the steel framing.

(2) Cranes, derricks, and other hoisting equipment used shall meet the requirements specified in part L of this chapter.

(3) Steel construction shall be dismantled column length by column length, and tier by tier (columns may be in two-story lengths).

(4) Any structural member being dismembered shall not be overstressed.

[Order 74-26, § 296-155-820, filed 5/7/74, effective 6/6/74.]

WAC 296-155-825 Mechanical demolition. (1) No workers shall be permitted in any area, which can be adversely affected by demolition operations, when balling or clamming is being performed. Only those workers necessary for the performance of the operations shall be permitted in this area at any other time.

(2) The weight of the demolition ball shall not exceed 50 percent of the crane's rated load, based on the length of the boom and the maximum angle of operation at which the demolition ball will be used, or it shall not exceed 25 percent of the nominal breaking strength of the line by which it is suspended, whichever results in a lesser value.

(3) The crane boom and loadline shall be as short as possible.

(4) The ball shall be attached to the loadline with a swivel-type connection to prevent twisting of the loadline, and shall be attached by positive means in such manner that the weight cannot become accidentally disconnected.

(5) When pulling over walls or portions thereof, all steel members affected shall have been previously cut free.

(6) All roof cornices or other such ornamental stonework shall be removed prior to pulling walls over.

(7) During demolition, continuing inspections by a competent person shall be made as the work progresses to detect hazards resulting from weakened or deteriorated floors, or walls, or loosened material. No employee shall be permitted to work where such hazards exist until they are corrected by shoring, bracing, or other effective means.

[Order 74-26, § 296-155-825, filed 5/7/74, effective 6/6/74.]

WAC 296-155-830 Selective demolition by explosives. Selective demolition by explosives shall comply with chapter 296-52 WAC.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-830, filed 1/21/86; Order 74-26, § 296-155-830, filed 5/7/74, effective 6/6/74.]

PART U POWER DISTRIBUTION AND TRANSMISSION LINES

(RESERVED)

Refer to chapter 296-44 WAC, "Safety standards for electrical construction work."

PART V ROLLOVER PROTECTIVE STRUCTURES AND OVERHEAD PROTECTION

WAC 296-155-950 Rollover protective structures (ROPS) for material handling equipment. (1) Coverage.

(a) This section applies to the following types of material handling equipment: To all rubber-tired, self-propelled scrapers, rubber-tired front-end loaders, rubber-tired dozers, wheel-type agricultural and industrial tractors, crawler tractors, crawler-type loaders, and motor graders, with or without attachments, that are used in construction work. This requirement does not apply to sideboom pipelaying tractors.

(b) The promulgation of specific standards for rollover protective structures for compactors and rubber-tired skidsteer equipment is reserved pending consideration of standards currently being developed.

(2) Equipment manufactured on or after September 1, 1972, Material handling machinery described in subsection (1) of this section and manufactured on or after September 1, 1972, shall be equipped with rollover protective structures which meet the minimum performance standards prescribed in WAC 296-155-955 and 296-155-960, as applicable.

(3) Equipment manufactured before September 1, 1972.

(a) All material handling equipment described in subsection (1) of this section and manufactured or placed in service (owned or operated by the employer) prior to September 1, 1972, shall be fitted with rollover protective structures.

Machines manufactured before July 1, 1969; Reserved pending further study, development, and review.

(b) Rollover protective structures and supporting attachment shall meet the minimum performance criteria detailed in WAC 296-155-955 and 296-155-960, as applicable or shall be designed, fabricated, and installed in a manner which will support, based on the ultimate strength of the metal, at least two times the weight of the prime mover applied at the point of impact.

(i) The design objective shall be to minimize the likelihood of a complete overturn and thereby minimize the possibility of the operator being crushed as a result of a rollover or upset.

(ii) The design shall provide a vertical clearance of at least 52 inches from the work deck to the ROPS at the point of ingress or egress.

(4) Remounting. ROPS removed for any reason, shall be remounted with equal quality, or better, bolts or welding as required for the original mounting.

(5) Labeling. Each ROPS shall have the following information permanently affixed to the structure:

- (a) Manufacturer or fabricator's name and address;
- (b) ROPS model number, if any;
- (c) Machine make, model, or series number that the structure is designed to fit.

(6) Machines meeting certain existing governmental requirements. Any machine in use, equipped with rollover protective structures, shall be deemed in compliance with this section if it meets the rollover protective structures requirements of the U.S. Army Corps of Engineers, or the Bureau of Reclamation of the U.S. Department of the Interior in effect on April 5, 1972. The requirements in effect are:

- (a) U.S. Army Corps of Engineers: General Safety Requirements, EM-385-1-1 (March 1967).
- (b) Bureau of Reclamation, U.S. Department of the Interior: Safety and Health Regulations for Construction, Part II (September 1971).

(7) ROPS meeting the criteria set forth in SAE J1040 a and SAE J1040 b shall be regarded as substantially meeting the requirements of this section, even if they do not meet all the criteria set forth in earlier criteria documents on which the present standard is based.

[Statutory Authority: Chapter 49.17 RCW. 91-03-044 (Order 90-18), § 296-155-950, filed 1/10/91, effective 2/12/91. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-074 (Order 86-14), § 296-155-950, filed 1/21/86; Order 76-29, § 296-155-950, filed 9/30/76; Order 74-26, § 296-155-950, filed 5/7/74, effective 6/6/74.]

WAC 296-155-955 Minimum performance criteria for rollover protective structures for designated scrapers, loaders, dozers, graders, and crawler tractors. (1) Definitions. For purposes of this section, "vehicle weight" means the manufacturer's maximum weight of the prime mover for rubber-tired self-propelled scrapers. For other types of equipment to which this section applies, "vehicle weight" means the manufacturer's maximum recommended weight of the vehicle plus the heaviest attachment.

(2) General.

(a) This section prescribes minimum performance criteria for rollover protective structures (ROPS) for rubber-tired self-propelled scrapers; rubber-tired front-end loaders and rubber-tired dozers; crawler tractors, and crawler-type loaders, and motor graders. The vehicle and ROPS as a system shall have the structural characteristics prescribed in subsection (7) of this section for each type of machine described in this subsection.

(b) Equipment listed in subsection (2)(a) of this section may be exempted from the requirements for fitment of ROPS where it can be shown, to the satisfaction of the department, that the equipment will only be used where no rollover hazard will exist.

(3) The static laboratory test prescribed herein will determine the adequacy of the structures used to protect the operator under the following conditions:

(a) For rubber-tired self-propelled scrapers, rubber-tired front-end loaders, and rubber-tired dozers: Operating between 0 and 10 miles per hour over hard clay where rollover would be limited to a maximum roll angle of 360° down a slope of 30° maximum.

(b) For motor graders: Operating between 0 and 10 miles per hour over hard clay where rollover would be limited to 360° down a slope of 30° maximum.

(c) For crawler tractors and crawler-type loaders: Operating between 0 and 10 miles per hour over hard clay where rollover would be limited to a maximum roll angle of 360° down a slope of 45°.

(4) Facilities and apparatus.

(a) The following material is necessary:

(i) Material, equipment, and tiedown means adequate to ensure that the ROPS and its vehicle frame absorb the applied energy.

(ii) Equipment necessary to measure and apply loads to the ROPS. Adequate means to measure deflection and lengths should also be provided.

(iii) Recommended, but not mandatory, types of test setups are illustrated in Figure V-1 for all types of equipment to which this section applies; and in Figure V-2 for rubber-tired self-propelled scrapers; Figure V-3 for rubber-tired front-end loaders, rubber-tired dozers, and motor graders; and Figure V-4 for crawler tractors and crawler-type loaders.

(b) Table V-1 contains a listing of the required apparatus for all types of equipment described in subsection (2)(a) of this section.

TABLE V-1

Means to measure	Accuracy
Deflection of ROPS, inches	± 5% of deflection measured.
Vehicle weight, pounds	± 5% of the weight measured.
Force applied to frame, pounds	± 5% of force measured.
Dimensions of critical zone, inches.	± 0.5 in.

(5) Vehicle condition. The ROPS to be tested must be attached to the vehicle structure in the same manner as it will be attached during vehicle use. A totally assembled vehicle is not required. However, the vehicle structure and frame which support the ROPS must represent the actual vehicle installation. All normally detachable windows, panels, or nonstructural fittings shall be removed so that they do not contribute to the strength of the ROPS.

(6) Test procedure. The test procedure shall include the following, in the sequence indicated:

(a) Energy absorbing capabilities of ROPS shall be verified when loaded laterally by incrementally applying a distributed load to the longitudinal outside top member of the ROPS, as shown in Figure V-1, V-2 or V-3 as applicable. The distributed load must be applied so as to result in approximately uniform deflection of the ROPS. The load increments should correspond with approximately 0.5 in. ROPS deflection increment in the direction of the load application, measured at the ROPS top edge. Should the operator's seat be off center, the load shall be applied on the off center side. For each applied load increment, the total load (lb.) versus corresponding deflection (in.) shall be plotted, and the area under the load-deflection curve shall be calculated. This area is equal to the energy (in.-lb.) ab-

sorbed by the ROPS. For a typical load-deflection curve and calculation method, see Figure V-5.

Incremental loading shall be continued until the ROPS has absorbed the amount of energy and the minimum applied load specified under subsection (7) of this section has been reached or surpassed.

(b) To cover the possibility of the vehicle coming to rest on its top, the support capability shall be verified by applying a distributed vertical load to the top of the ROPS so as to result in approximately uniform deflection (see Figure V-1). The load magnitude is specified in subsection (7)(b)(iii) of this section.

(c) The low temperature impact strength of the material used in the ROPS shall be verified by suitable material tests or material certification (see subsection (7)(b)(iv) of this section).

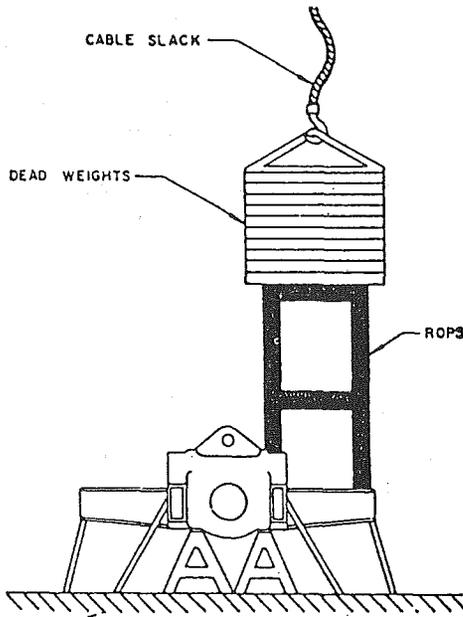


FIGURE V-1

Vertical loading setup for all types of equipment described in WAC 296-155-955(1).

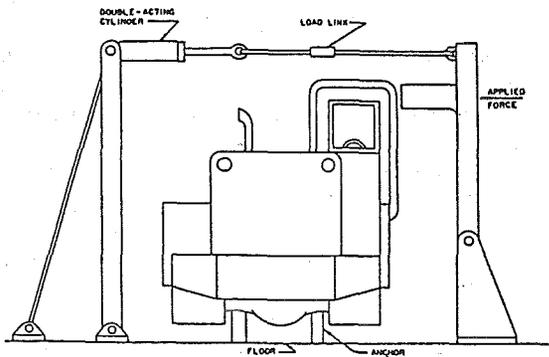


FIGURE V-2

Test setup for rubber-tired self-propelled scrapers.

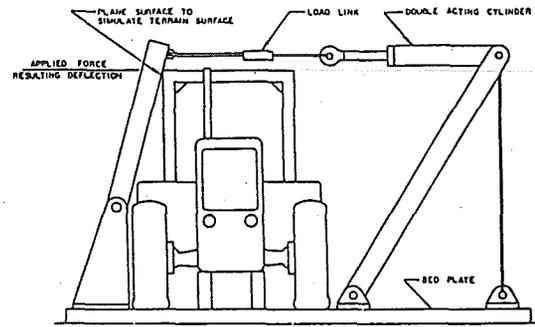


FIGURE V-3

Test setup for rubber-tired front-end loaders, rubber-tired dozers, and motor graders.

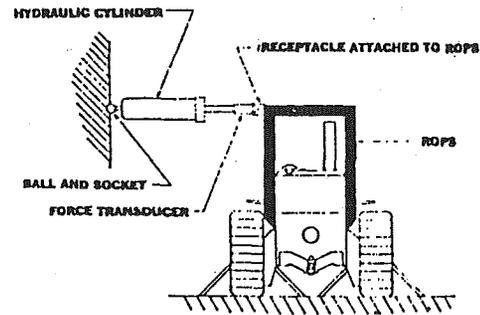
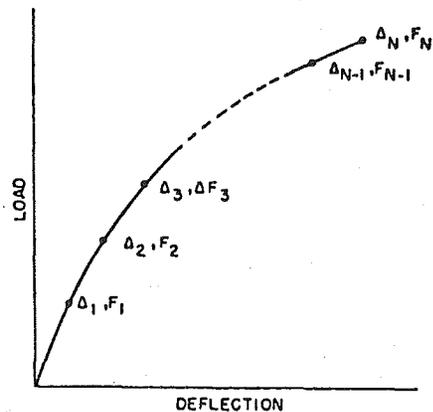


FIGURE V-4

Side-loading setup for crawler tractors and crawler loaders.



Δ - TOTAL DEFLECTION
F - FORCE APPLIED

$$\text{AREA} = \frac{\Delta_1 F_1}{2} + (\Delta_2 - \Delta_1) \frac{F_1 + F_2}{2} + (\Delta_3 - \Delta_2) \frac{F_2 + F_3}{2} + \dots + (\Delta_N - \Delta_{N-1}) \frac{F_{N-1} + F_N}{2}$$

FIGURE V-5

Determination of energy area under force deflection curve for all types of ROPS equipment defined in WAC 296-155-955.

(7) Performance requirements.

(a) General performance requirements.

(i) No repairs or straightening of any member shall be carried out between each prescribed test.

(ii) During each test, no part of the ROPS shall enter the critical zone as detailed in SAE J397 (1969). Deformation of the ROPS shall not allow the plane of the ground to enter this zone.

(b) Specific performance requirements.

(i) The energy requirement for purposes of meeting the requirements of subsection (6)(a) of this section is to be determined by referring to the plot of the energy versus weight of vehicle (see Figure V-6 for rubber-tired self-propelled scrapers; Figure V-7 for rubber-tired front-end loaders and rubber-tired dozers; Figure V-8 for crawler tractors and crawler-type loaders; and Figure V-9 for motor graders. For purposes of this section, force and weight are measured as pounds; energy (U) is measured as inch-pounds).

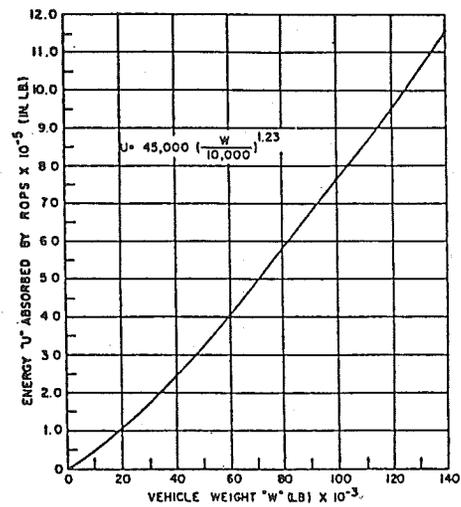


FIGURE V-8

Energy absorbed versus vehicle weight.

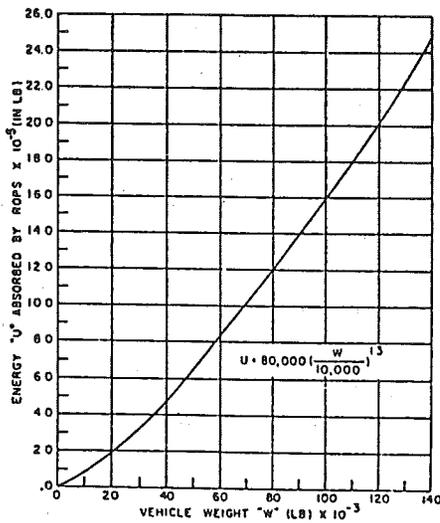


FIGURE V-6

Energy absorbed versus vehicle weight.

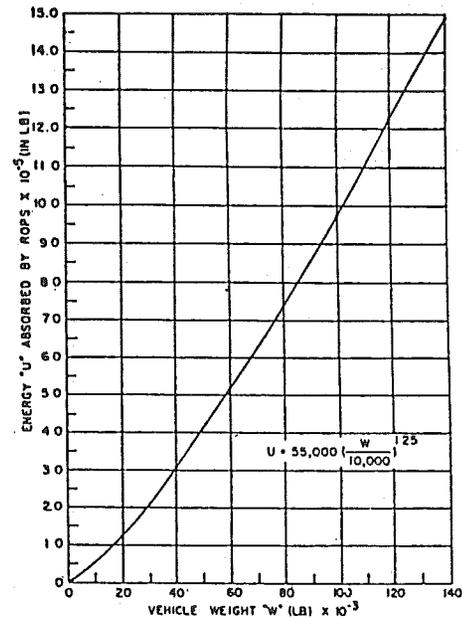


FIGURE V-9

Energy absorbed versus vehicle weight.

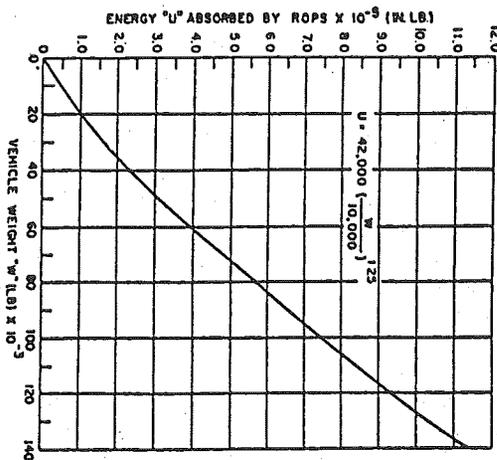


FIGURE V-7

Energy absorbed versus vehicle weight.

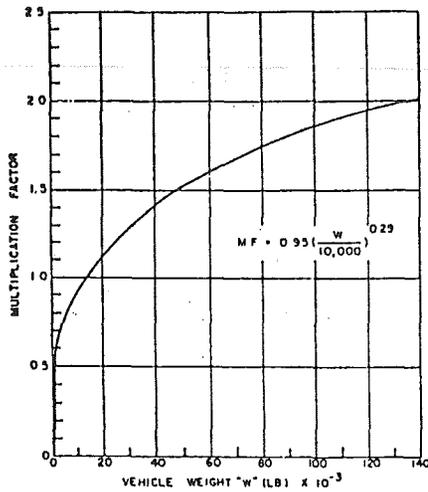


FIGURE V-10

Minimum horizontal load factor for self-propelled scrapers.

(ii) The applied load must attain at least a value which is determined by multiplying the vehicle weight by the corresponding factor shown in Figure V-10 for rubber-tired self-propelled scrapers; in Figure V-11 for rubber-tired front-end loaders and rubber-tired dozers; in Figure V-12 for crawler tractors and crawler-type loaders; and in Figure V-13 for motor graders.

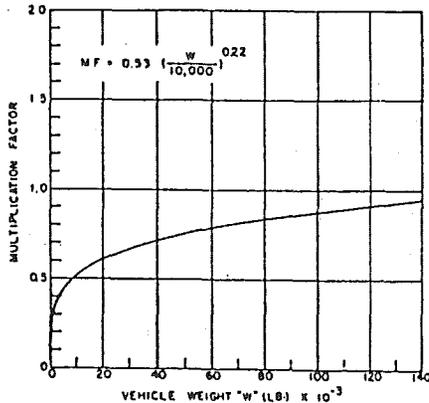


FIGURE V-11

Minimum horizontal load factor for rubber-tired loaders and dozers.

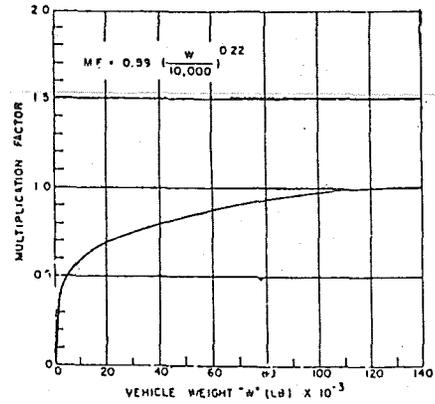


FIGURE V-12

Minimum horizontal load factor for crawler tractors and crawler-type loaders.

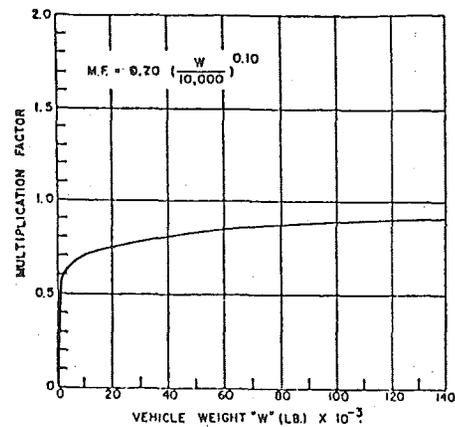


FIGURE V-13

Minimum horizontal load factor for motor graders.

(iii) The load magnitude for purposes of compliance with subsection (6)(b) of this section is equal to the vehicle weight. The test of load magnitude shall only be made after the requirements of subdivision (b)(i) of this subsection are met.

(iv) Material used in the ROPS must have the capability of performing at zero degrees Fahrenheit, or exhibit Charpy V notch impact strength of 8 foot-pounds at minus 20° Fahrenheit. This is a standard Charpy specimen as described in American Society of Testing and Materials A 370, Methods and Definitions for Mechanical Testing of Steel Products. The purpose of this requirement is to reduce the tendency of brittle fracture associated with dynamic loading, low temperature operation, and stress raisers which cannot be entirely avoided on welded structures.

(8) Source of standard. This standard is derived from, and restates, the following Society of Automotive Engineers Recommended Practices: SAE J320a, Minimum Performance Criteria for Roll-Over Protective Structure for Rubber-Tired, Self-Propelled Scrapers; SAE J394, Minimum Performance Criteria for Roll-Over Protective Structure for Rubber-Tired Front- End Loaders and Rubber-Tired Dozers; SAE J395, Minimum Performance Criteria for Roll-Over Protective Structure for Crawler Tractors and Crawler-Type Loaders; and SAE J396, Minimum Performance Criteria for

Roll-Over Protective Structure for Motor Graders. These recommended practices shall be resorted to in the event that questions of interpretation arise. The recommended practices appear in the 1971 SAE Handbook, which may be examined in each of the district offices of the department of labor and industries.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-155-955, filed 7/20/94, effective 9/20/94; Order 74-26, § 296-155-955, filed 5/7/74, effective 6/6/74.]

WAC 296-155-960 Protective frame (ROPS) test procedures and performance requirements for wheel-type agricultural and industrial tractors used in construction.

(1) Definitions applicable to this section.

(a) SAE J333a, Operator Protection for Wheel-Type Agricultural and Industrial Tractors (July 1970) defines "agricultural tractor" as a "wheel-type vehicle of more than 20 engine horsepower designed to furnish the power to pull, carry, propel, or drive implements that are designed for agricultural usage." Since this chapter applies only to construction work, the following definition of "agricultural tractor" is adopted for purposes of this part: "Agricultural tractor" means a wheel-type vehicle of more than 20 engine horsepower, used in construction work, which is designed to furnish the power to pull, propel, or drive implements.

(b) "Industrial tractor" means that class of wheeled type tractor of more than 20 engine horsepower (other than rubber-tired loaders and dozers described in WAC 296-155-955), used in operations such as landscaping, construction services, loading, digging, grounds keeping, and highway maintenance.

(c) The following symbols, terms, and explanations apply to this section:

E_{is} = Energy input to be absorbed during side loading. $E_{is} = 723 + 0.4 W$ ft.-lb. ($E'_{is} = 100 + 0.12 W'$, m. - kg).

E_{ir} = Energy input to be absorbed during rear loading. $E_{ir} = 0.47 W$ ft. - lb. ($E'_{ir} = 0.14 W'$, m. - kg).

W = Tractor weight as prescribed in WAC 296-155-960 (5)(a) and (5)(c) in lb. (W' , kg).

L = Static load, lb. (kg.).

D = Deflection under L , in. (mm.).

$L-D$ = Static load-deflection diagram.

L_m-D_m = Modified static load-deflection diagram (Figure V-20). To account for increase in strength due to increase in strain rate, raise L in plastic range to $L \times K$.

K = Increase in yield strength induced by higher rate of loading (1.3 for hot rolled low carbon steel 1010-1030). Low carbon is preferable; however, if higher carbon or other material is used, K must be determined in the laboratory. Refer to Charles H. Norris, et al., Structural Design for Dynamic Loads (1959), p. 3.

L_{max} = Maximum observed static load.

Load limit = Point on $L-D$ curve where observed static load is $0.8 L_{max}$ (refer to Figure V-19).

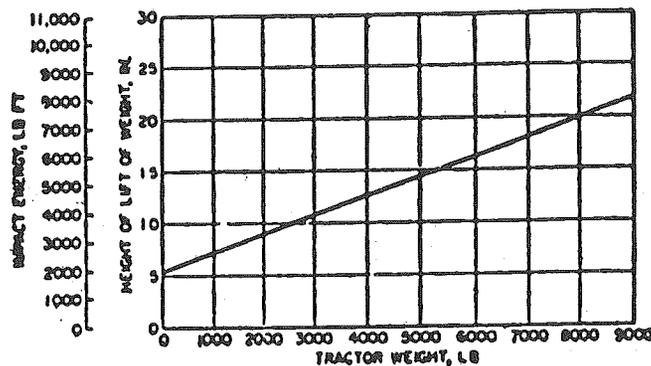
E_s = Strain energy absorbed by the frame, ft.-lb. (m. - kg) area under L_m-D_m curve.

FER = Factor of energy ratio, $FER = E_s/E_{is}$; also $= E_s/E_{ir}$.

P_s = Maximum observed force in mounting connection under static load, L , lb. (kg.).

FSB = Design margin for mounting connection $FSB = (P/P_s)-1$.

H = Vertical height of lift of 4,410 lb. (2,000 kg.) weight, in. (H' , mm.). The weight shall be pulled back so that the height of its center of gravity above the point of impact is defined as follows: $H = 4.92 + 0.00190 W$ or ($H' = 125 + 0.107 W'$) (Figure V-14).



NOTATION OF FORMULAE
 $H = 4.92 + 0.00190 W$ OR $H' = 125 + 0.107 W'$
 W = TRACTOR WEIGHT AS DEFINED IN PARAGRAPH 3) IN POUNDS (W' IN KG)

FIGURE V-14

Impact energy and corresponding lift height of 4,410 lb. (2,000 kg.) weight.

(ii) Source of standard. The standard in this section is derived from, and restates, Society of Automotive Engineers Standard J334a (July 1970), Protective Frame Test Procedures and performance requirements. This standard shall be resorted to in the event that questions of interpretation arise. The standard appears in the 1971 SAE Handbook.

(2) General.

(a) The purpose of this section is to set forth requirements for frames for the protection of operators of wheel type agricultural and industrial tractors to minimize the possibility of operator injury resulting from accidental upsets during normal operation. With respect to agricultural and industrial tractors, the provisions of WAC 296-155-955 and 296-155-965 for rubber-tired dozers and rubber-tired loaders may be utilized in lieu of the requirements of this section.

(b) The protective frame which is the subject of this standard is a structure mounted to the tractor that extends above the operator's seat and conforms generally to Figure V-15.

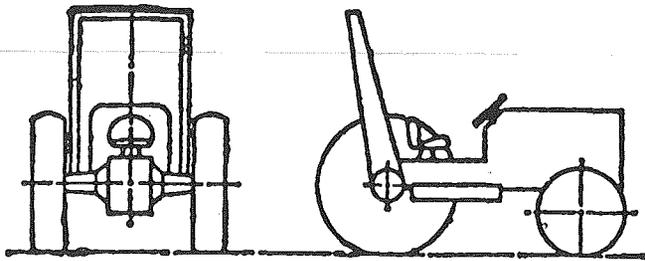


FIGURE V-15

Typical frame configuration.

(c) If an overhead weather shield is attached to the protective frame, it may be in place during tests: *Provided*, That it does not contribute to the strength of the protective frame. If such an overhead weather shield is attached, it must meet the requirements of subsection (10) of this section.

(d) For overhead protection requirements, see WAC 296-155-965.

(e) If protective enclosures are used on wheel-type agricultural and industrial tractors, they shall meet the requirements of Society of Automotive Engineers Standard J168 (July 1970), Protective Enclosures, Test Procedures, and performance requirements.

(3) Applicability. The requirements of this section apply to wheel-type agricultural tractors use in construction work and to wheel-type industrial tractors used in construction work. See subsection (1) of this section for definitions of agricultural tractors and industrial tractors.

(4) Performance requirements.

(a) Either a laboratory test or a field test is required in order to determine the performance requirements set forth in subsection (10) of this section.

(b) A laboratory test may be either static or dynamic. The laboratory test must be under conditions of repeatable and controlled loading in order to permit analysis of the protective frame.

(c) A field upset test, if used, shall be conducted under reasonably controlled conditions, both rearward and sideways, to verify the effectiveness of the protective frame under actual dynamic conditions.

(5) Test procedure—General.

(a) The tractor used shall be the tractor with the greatest weight on which the protective frame is to be used.

(b) A new protective frame and mounting connections of the same design shall be used for each test procedure.

(c) Instantaneous and permanent frame deformation shall be measured and recorded for each segment of the test.

(d) Dimensions relative to the seat shall be determined with the seat unloaded and adjusted to its highest and most rearward latched position provided for a seated operator.

(e) If the seat is offset, the frame loading shall be on the side with the least space between the centerline of the seat and the upright.

(f) The low temperature impact strength of the material used in the protective structure shall be verified by suitable material tests or material certifications in accordance with WAC 296-155-955 (7)(b)(iv).

(6) Test procedure for vehicle overturn.

(a) Vehicle weight. The weight of the tractor, for purposes of this section, includes the protective frame, all fuels, and other components required for normal use of the tractor. Ballast must be added if necessary to achieve a minimum total weight of 130 lb. (59 kg.) per maximum power takeoff horsepower at rated engine speed. The weight of the front end must be at least 33 lb. (15 kg.) per maximum power takeoff horsepower. In case power takeoff horsepower is unavailable, 95 percent of net engine flywheel horsepower shall be used.

(b) Agricultural tractors shall be tested at the weight set forth in subdivision (a) of this subsection.

(c) Industrial tractors shall be tested with items of integral or mounted equipment and ballast that are sold as standard equipment or approved by the vehicle manufacturer for use with the vehicle where the protective frame is expected to provide protection for the operator with such equipment installed. The total vehicle weight and front end weight as tested shall not be less than the weights established in subdivision (a) of this subsection.

(d) The test shall be conducted on a dry, firm soil bank as illustrated in Figure V-16. The soil in the impact area shall have an average cone index in the 0.6 in. (153 mm.) layer not less than 150 according to American Society of Agricultural Engineers Recommendations ASAE R313, Soil Cone Penetrometer. The path of travel of the vehicle shall be $12^\circ \pm 2^\circ$ to the top edge of the bank.

(e) The upper edge of the bank shall be equipped with an 18 in. (457 mm.) high ramp as described in Figure V-16 to assist in tipping the vehicle.

(f) The front and rear wheel tread settings, where adjustable, shall be at the position nearest to halfway between the minimum and maximum settings obtainable on the vehicle. Where only two settings are obtainable, the minimum setting shall be used.

(g) Vehicle overturn test—Sideways and rearward.

(i) The tractor shall be driven under its own power along the specified path of travel at a minimum speed of 10 m.p.h. (16 km./hr.) or maximum vehicle speed if under 10 m.p.h. (16 km./hr.) up the ramp as described in subdivision (e) of this subsection to induce sideways overturn.

(ii) Rear upset shall be induced by engine power with the tractor operating in gear to obtain 3-5 m.p.h. (4.8-8 km./hr.) at maximum governed engine r.p.m. preferably by driving forward directly up a minimum slope of two vertical to one horizontal. The engine clutch may be used to aid in inducing the upset.

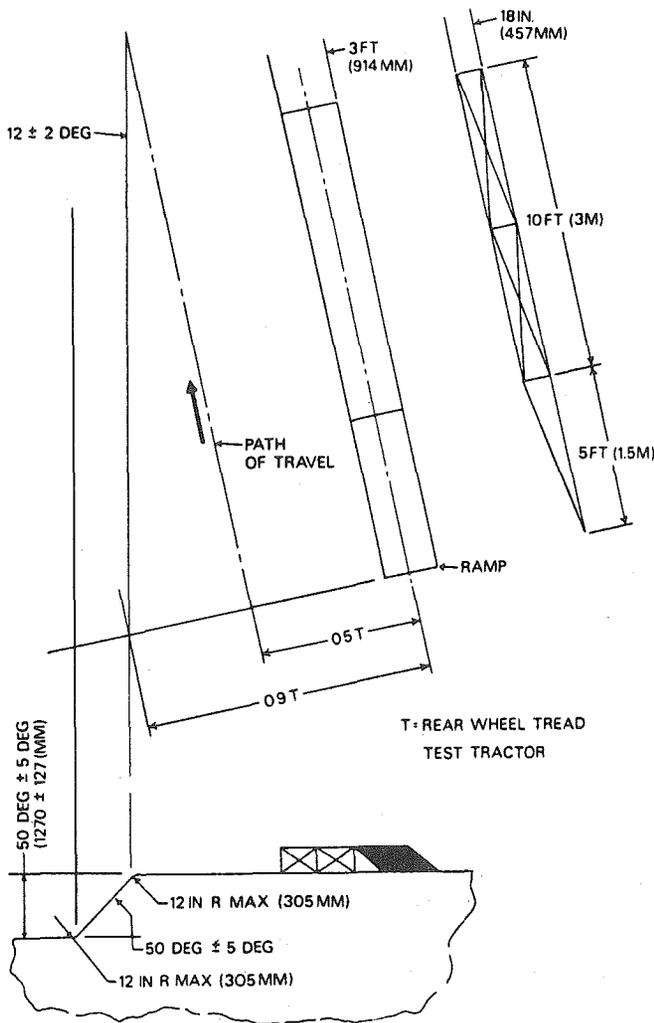


FIGURE V-16

(7) Other test procedures. When the field upset test is not used to determine ROPS performance, either the static test or the dynamic test, contained in subsection (8) or (9) of this section, shall be made.

(8) Static test.

(a) Test conditions.

(i) The laboratory mounting base shall include that part of the tractor chassis to which the protective frame is attached including the mounting parts.

(ii) The protective frame shall be instrumented with the necessary equipment to obtain the required load deflection data at the locations and directions specified in Figures V-17, V-18, and V-19.

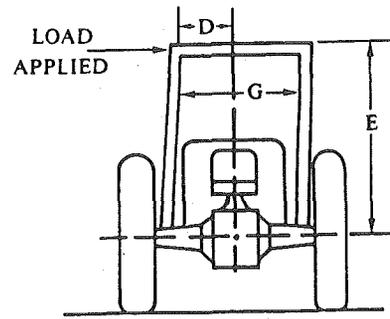


FIGURE V-17

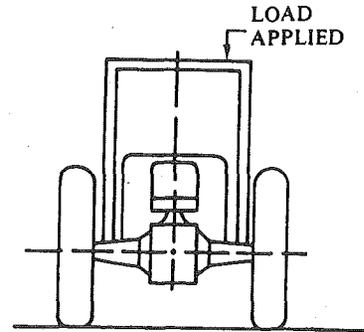


FIGURE V-18

Rear load application.

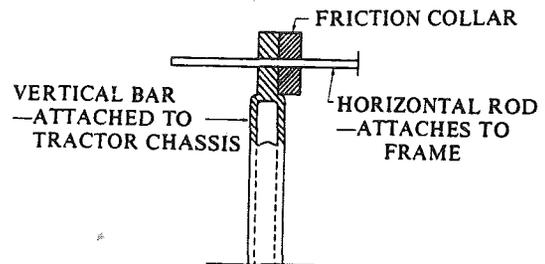
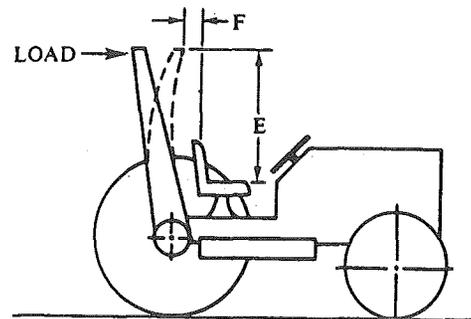


FIGURE V-19

Method of measuring instantaneous deflection.

(iii) The protective frame and mounting connections shall be instrumented with the necessary recording equipment to obtain the required load-deflection data to be used in calculating FSB (see subsection (1)(c) of this section). The gauges shall be placed on mounting connections before the installation load is applied.

(b) Test procedure.

(i) The side load application shall be at the upper extremity of the frame upright at a 90° angle to the centerline of the vehicle. The side load "L" shall be applied according to Figure V-17. "L" and "D" shall be recorded simultaneously. The test shall be stopped when:

(a) The strain energy absorbed by the frame is equal to the required input energy (E_{ir}) or

(b) Deflection of the frame exceeds the allowable deflection, or

(c) The frame load limit occurs before the allowable deflection is reached in the side load.

(ii) The L-D diagram, as shown by means of a typical example in Figure V-20, shall be constructed, using the data obtained in accordance with item (i) of this subdivision.

(iii) The modified L_m - D_m diagram shall be constructed according to item (ii) of this subdivision and according to Figure V-21. The strain energy absorbed by the frame (E_u) shall then be determined.

(iv) E_u , FER and FSB shall be calculated.

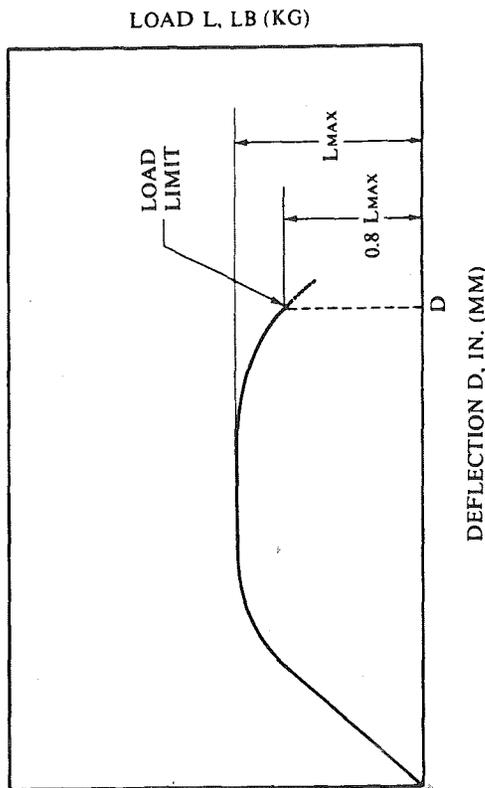


FIGURE V-20
Typical L-D diagram.

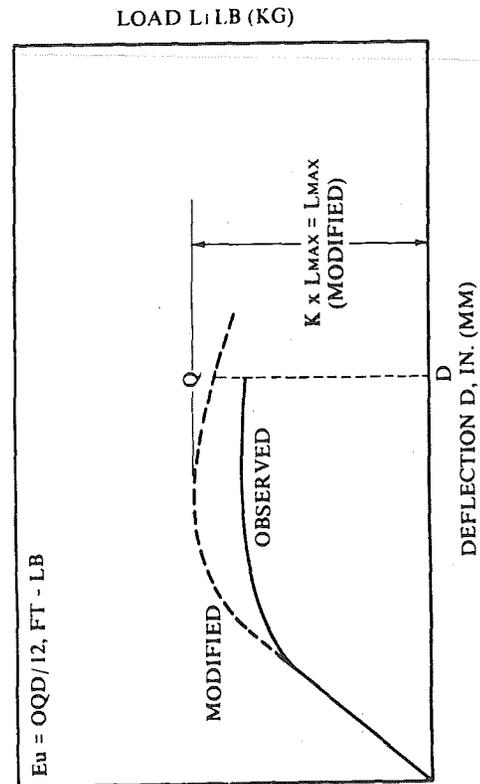


FIGURE V-21
Typical modified L_m - D_m diagram.

(v) The test procedure shall be repeated on the same frame utilizing L (rear input; see Figure V-19) and E_{ir} . Rear load application shall be uniformly distributed along a maximum projected dimension of 27 in. (686 mm.) and a maximum area of 160 sq. in. (1,032 sq. cm.) normal to the direction of load application. The load shall be applied to the upper extremity of the frame at the point which is midway between the centerline of the seat and the inside of the frame upright.

(9) Dynamic test.

(a) Test conditions.

(i) The protective frame and tractor shall meet the requirements of subsection (6)(b) or (c) of this section, as appropriate.

(ii) The dynamic loading shall be produced by use of a 4,410 lb. (2,000 kg.) weight acting as a pendulum. The impact face of the weight shall be 27 plus or minus 1 in. by 27 plus or minus 1 in. (686 + or - 25 mm.) and shall be constructed so that its center of gravity is within 1 in. (25.4 mm.) of its geometric center. The weight shall be suspended from a pivot point 18-22 ft. (5.5-6.7 m.) above the point of impact on the frame and shall be conveniently and safely adjustable for height. (See Figure V-22.)

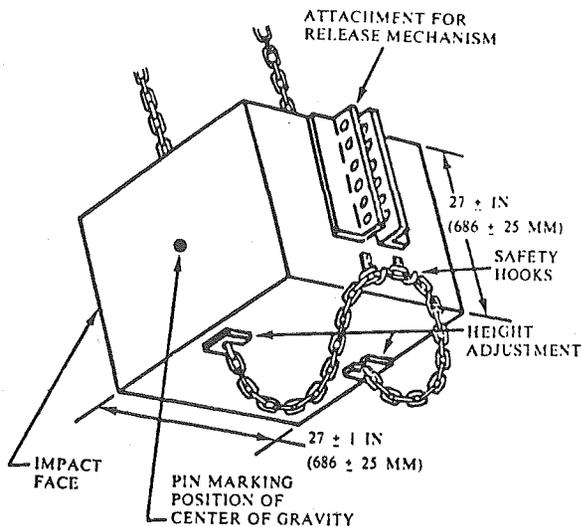


FIGURE V-22
Pendulum.

(iii) For each phase of testing, the tractor shall be restrained from moving when the dynamic load is applied. The restraining members shall be of 0.5-0.63 in. (12.5-16 mm.) steel cable and points of attaching restraining members shall be located an appropriate distance behind the rear axle and in front of the front axle to provide a 15°-30° angle between a restraining cable and the horizontal. The restraining member shall either be in the plane in which the center gravity of the pendulum will swing or more than one restraining cable shall give a resultant force in this plane. (See Figure V-23.)

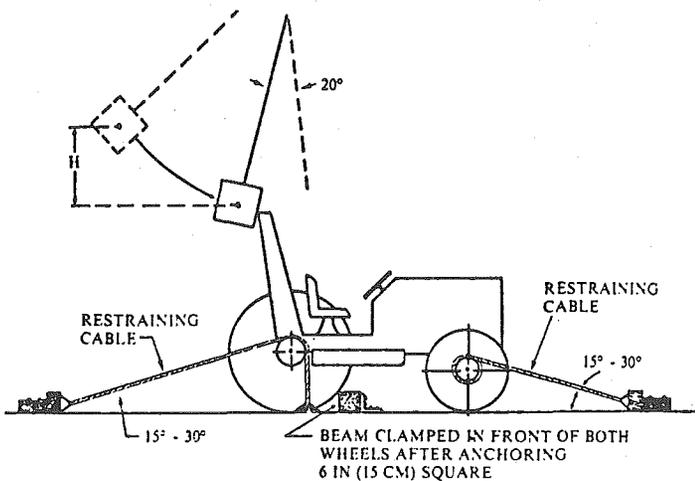


FIGURE V-23
Method of impact from rear.

(iv) The wheel tread setting shall comply with the requirements of subsection (6)(f) of this section. The tires shall have no liquid ballast and shall be inflated to the maximum operating pressure recommended by the tire manufacturer. With specified tire inflation, the restraining cables shall be tightened to provide tire deflection of 6-8 percent of nominal tire section width. After the vehicle is properly restrained, a wooden beam 6 x 6 in. (15 x 15 cm.)

shall be driven tightly against the appropriate wheels and clamped. For the test to the side, an additional wooden beam shall be placed as a prop against the wheel nearest the operator's station and shall be secured to the floor so that it is held tightly against the wheel rim during impact. The length of this beam shall be chosen so that when it is positioned against the wheel rim it is at an angle of 25°-40° to the horizontal. It shall have a length 20-25 times its depth and a width two to three times its depth. (See Figures V-23 and V-24.)

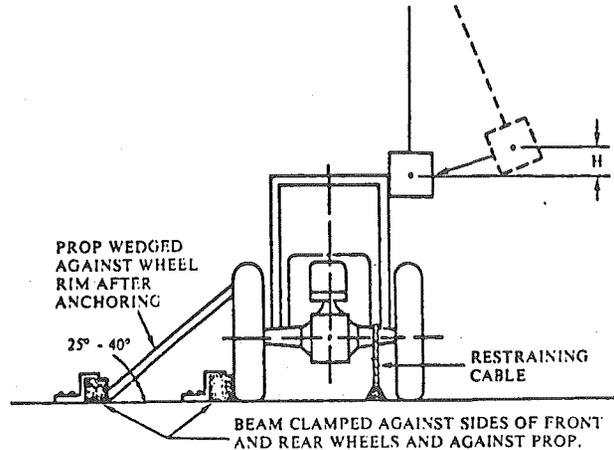


FIGURE V-24
Method of impact from side.

(v) Means shall be provided indicating the maximum instantaneous deflection along the line of impact. A simple friction device is illustrated in Figure V-24.

(vi) No repair or adjustments may be carried out during the test.

(vii) If any cables, props, or blocking shift or break during the test, the test shall be repeated.

(b) Test procedure.

(i) General. The frame shall be evaluated by imposing dynamic loading to rear followed by a load to the side on the same frame. The pendulum dropped from the height (see definition "H" in subsection (1)(c) of this section) imposes the dynamic load. The position of the pendulum shall be so selected that the initial point of impact on the frame shall be in line with the arc of travel of the center of gravity of the pendulum. A quick release mechanism should be used but, if used, shall not influence the attitude of the block.

(ii) Impact at rear. The tractor shall be properly restrained according to subdivisions (a)(iii) and (iv) of this section. The tractor shall be positioned with respect to the pivot point of the pendulum such that the pendulum is 20° from the vertical prior to impact, as shown in Figure V-23. The impact shall be applied to the upper extremity of the frame at the point which is midway between the centerline of the seat and the inside of the frame upright of a new frame.

(iii) Impact at side. The block and restraining shall conform to subdivisions (a)(iii) and (iv) of this subsection. The point of impact shall be that structural member of the

protective frame likely to hit the ground first in a sideways accidental upset. The side impact shall be applied to the side opposite that used for rear impact.

(10) Performance requirements.

(a) General.

(i) The frame, overhead weather shield, fenders, or other parts in the operator area may be deformed but shall not shatter or leave sharp edges exposed to the operator, or violate dimensions as shown in Figures V-17 and V-18 as follows:

- D = 2 in. (51 mm.) inside of frame upright to vertical centerline of seat.
- E = 30 in. (762 mm.).
- F = Not less than 0 in. and not more than 12 in. (305 mm.), measured at centerline front of seat backrest to crossbar along the line of load application as shown in Figure V-17.
- G = 24 in. (610 mm.).

(ii) The material and design combination used in the protective structure must be such that the structure can meet all prescribed performance tests at zero degrees Fahrenheit in accordance with WAC 296-155-955 (7)(b)(iv).

(b) Vehicle overturn performance requirements. The requirements of this subsection (10) must be met in both side and rear overturns.

(c) Static test performance requirements. Design factors shall be incorporated in each design to withstand an overturn test as prescribed in this subsection (10). The structural requirements will be generally met if FER is greater than 1 and FSB is greater than K-1 in both side and rear loadings.

(d) Dynamic test performance requirements. Design factors shall be incorporated in each design to withstand the overturn test prescribed in this subsection (10). The structural requirements will be generally met if the dimensions in this subsection (10) are adhered to in both side and rear loads.

[Order 74-26, § 296-155-960, filed 5/7/74, effective 6/6/74.]

WAC 296-155-965 Overhead protection for operators of agricultural and industrial tractors. (1) General.

(a) Purpose. When overhead protection is provided on wheel-type agricultural and industrial tractors, the overhead protection shall be designed and installed according to the requirements contained in this section. The provisions of WAC 296-155-955 for rubber-tired dozers and rubber-tired loaders may be used in lieu of the standards contained in this section. The purpose of the standard is to minimize the possibility of operator injury resulting from overhead hazards such as flying and falling objects, and at the same time to minimize the possibility of operator injury from the cover itself in the event of accidental upset.

(b) Applicability. This section applies to wheel-type agricultural tractors used in construction work and to wheel-type industrial tractors used in construction work. See WAC 296-155-960 (1) and (3). In the case of machines to which WAC 296-155-625 (relating to site clearing) also applies, the overhead protection may be either the type of protection provided in WAC 296-155-625 or the type of protection provided by this section.

(2) Overhead protection. When overhead protection is installed on wheel-type agricultural or industrial tractors used in construction work, it shall meet the requirements of this subsection. The overhead protection may be constructed of a solid material. If grid or mesh is used, the largest permissible opening shall be such that the maximum circle which can be inscribed between the elements of the grid or mesh is 1.5 in. (38 mm.) in diameter. The overhead protection shall not be installed in such a way as to become a hazard in the case of upset.

(3) Test procedures—General.

(a) The requirements of WAC 296-155-960 (5), (6) and (7) shall be met.

(b) Static and dynamic rear load application shall be uniformly distributed along a maximum projected dimension of 27 in. (686 mm.) and a maximum area of 160 in.² (1,032 cm.²) normal direction of load application. The load shall be applied to the upper extremity of the frame at the point which is midway between the centerline of the seat and the inside of the frame upright.

(c) The static and dynamic side load application shall be uniformly distributed along a maximum projected dimension of 27 in. (686 mm.) and a maximum area of 160 in.² (1,032 cm.²) normal to the direction of load application. The direction of load application is the same as in WAC 296-155-960 (8) and (9). To simulate the characteristics of the structure during an upset, the center of load application may be located from a point 24 in. (610 mm.) (K) forward to 12 in. (305 mm.) (K) forward to 12 in. (305 mm.) (L) rearward of the front of the seat backrest to best utilize the structural strength. See Figure V-25.

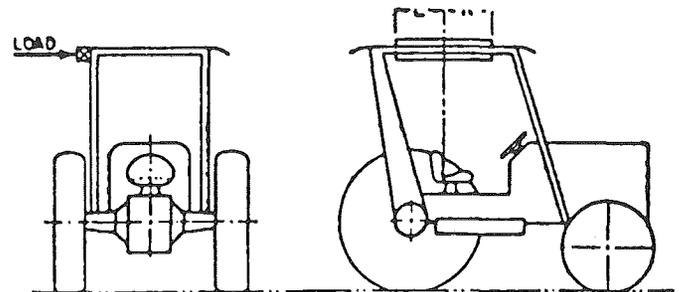


FIGURE V-25

Location for side load.

(4) Drop test procedures.

(a) The same frame shall be subjected to the drop test following either the static or dynamic test.

(b) A solid steel sphere or material of equivalent spherical dimension weighing 100 lb. (45.4 kg.) shall be dropped once from a height 10 ft. (3,048 mm.) above the overhead cover.

(c) The point of impact shall be on the overhead cover at a point within the zone of protection as shown in Figure V-26, which is furthest removed from major structural members.

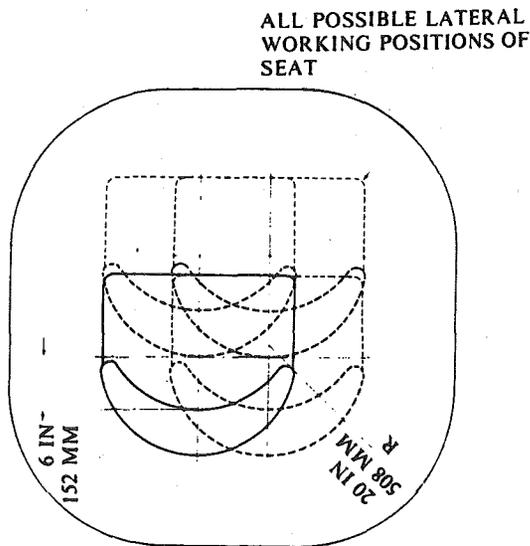


FIGURE V-26

Zone of protection for drop test.

(5) Crush test procedure.

(a) The same frame shall be subjected to the crush test following the drop test and static or dynamic test.

(b) The test load shall be applied as shown in Figure V-27 with the seat positioned as specified in WAC 296-155-960 (5)(d). Loading cylinders shall be pivotally mounted at both ends. Loads applied by each cylinder shall be equal within 2 percent, and the sum of the loads of the two cylinders shall be two times the tractor weight as set forth in WAC 296-155-960 (6)(a). The maximum width of the beam illustrated in Figure V-27 shall be 6 in. (152 mm.).

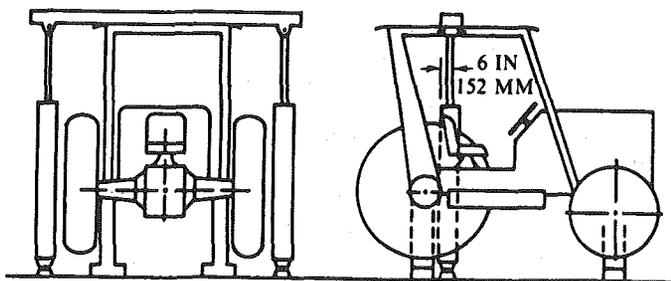


FIGURE V-27

Method of load application for crush test.

(6) Performance requirements.

(a) General. The performance requirements set forth in WAC 296-155-960 (10)(b), (c) and (d) shall be met.

(b) Drop test performance requirements.

(i) Instantaneous deformation due to impact of the sphere shall not enter the protected zone as illustrated in Figures V-25, V-26, and V-28.

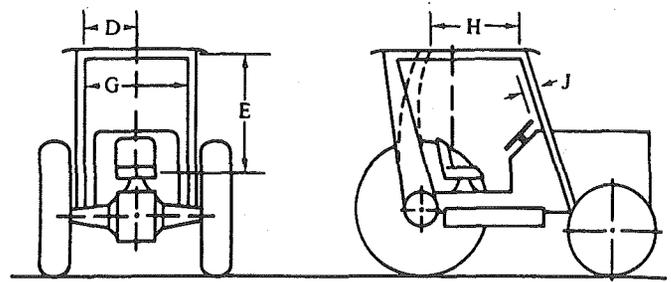


FIGURE V-28

Protected zone during crush and drop tests.

(ii) In addition to the dimensions set forth in WAC 296-155-960(10)(a)(i) the following dimensions apply to Figure V-28:

H = 17.5 in. (444 mm.).

J = 2 in. (50.8 mm.) measured from the outer periphery of the steering wheel.

(c) Crush test performance requirements. The protected zone as described in Figure V-28 must not be violated.

(7) Source of standard. This standard is derived from, and restates, the portions of Society of Automotive Engineers Standard J167 which pertain to overhead protection requirements. The full title of the SAE standard is: Protective Frame with Overhead Protection—Test Procedures and performance requirements. The SAE standard shall be resorted to in the event that questions of interpretation arise. The SAE standard appears in the 1971 SAE Handbook.

[Order 74-26, § 296-155-965, filed 5/7/74, effective 6/6/74.]

Chapter 296-200 WAC

CONTRACTOR CERTIFICATE OF REGISTRATION RENEWALS—SECURITY—INSURANCE

WAC

296-200-005	Purpose of chapter.
296-200-015	Definitions.
296-200-025	Initial application for registration and renewal of registration.
296-200-035	Length of registration period.
296-200-040	Suspension of contractor's registration.
296-200-050	Change in business structure, name, or address.
296-200-060	Cancelling surety bonds and insurance policies.
296-200-070	Refund of security deposited with the section.
296-200-080	Filing suit against a contractor.
296-200-090	Collection of judgments.
296-200-100	Priority for payment of judgments.
296-200-110	Verification of registration number by a city, town, or county.
296-200-111	Verification of nonoriginal registration card by city, town, or county.
296-200-112	Liability to cities, towns, and counties for failure to verify contractor registration.
296-200-300	Procedures for issuance of notices of infraction.
296-200-310	Service on employee of a contractor.
296-200-320	Mailing copy of notice of infraction to contractor.
296-200-330	Issuance of notices of infraction under RCW 18.27.100 or 18.27.200.
296-200-340	Right to contested hearing—Place to file.
296-200-350	Administrative law judge shall preside in contested hearings.
296-200-360	Representation by counsel.

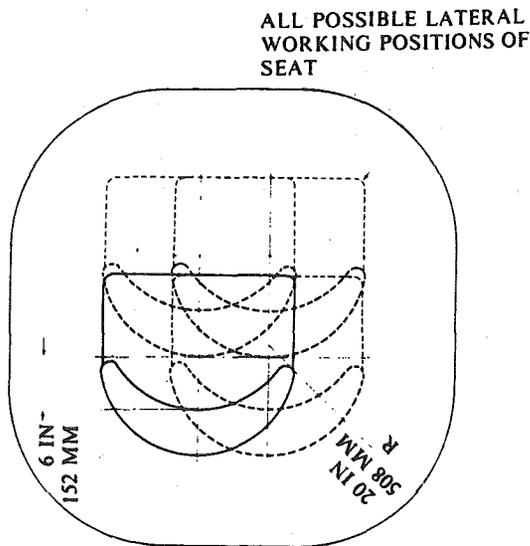


FIGURE V-26

Zone of protection for drop test.

(5) Crush test procedure.

(a) The same frame shall be subjected to the crush test following the drop test and static or dynamic test.

(b) The test load shall be applied as shown in Figure V-27 with the seat positioned as specified in WAC 296-155-960 (5)(d). Loading cylinders shall be pivotally mounted at both ends. Loads applied by each cylinder shall be equal within 2 percent, and the sum of the loads of the two cylinders shall be two times the tractor weight as set forth in WAC 296-155-960 (6)(a). The maximum width of the beam illustrated in Figure V-27 shall be 6 in. (152 mm.).

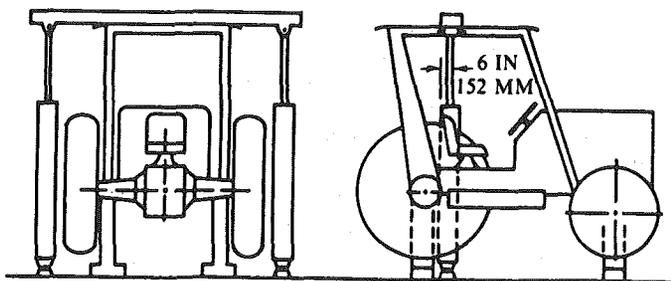


FIGURE V-27

Method of load application for crush test.

(6) Performance requirements.

(a) General. The performance requirements set forth in WAC 296-155-960 (10)(b), (c) and (d) shall be met.

(b) Drop test performance requirements.

(i) Instantaneous deformation due to impact of the sphere shall not enter the protected zone as illustrated in Figures V-25, V-26, and V-28.

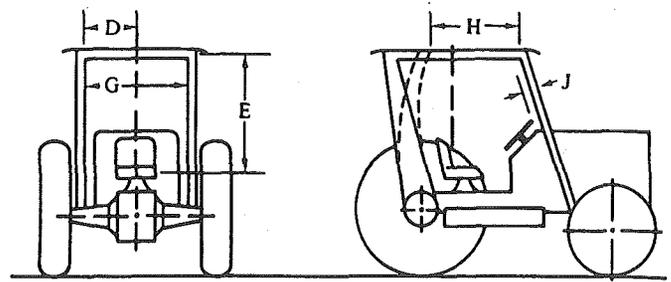


FIGURE V-28

Protected zone during crush and drop tests.

(ii) In addition to the dimensions set forth in WAC 296-155-960(10)(a)(i) the following dimensions apply to Figure V-28:

H = 17.5 in. (444 mm.).

J = 2 in. (50.8 mm.) measured from the outer periphery of the steering wheel.

(c) Crush test performance requirements. The protected zone as described in Figure V-28 must not be violated.

(7) Source of standard. This standard is derived from, and restates, the portions of Society of Automotive Engineers Standard J167 which pertain to overhead protection requirements. The full title of the SAE standard is: Protective Frame with Overhead Protection—Test Procedures and performance requirements. The SAE standard shall be resorted to in the event that questions of interpretation arise. The SAE standard appears in the 1971 SAE Handbook.

[Order 74-26, § 296-155-965, filed 5/7/74, effective 6/6/74.]

Chapter 296-200 WAC

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WAC

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296-200-100	Priority for payment of judgments.
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296-200-320	Mailing copy of notice of infraction to contractor.
296-200-330	Issuance of notices of infraction under RCW 18.27.100 or 18.27.200.
296-200-340	Right to contested hearing—Place to file.
296-200-350	Administrative law judge shall preside in contested hearings.
296-200-360	Representation by counsel.

296-200-370	Contested cases—Notice—Hearing—Summary orders—Informal disposition—Record—Findings of fact.
296-200-380	Contested cases—Evidence.
296-200-390	Administration of appeals.
296-200-400	Fines.
296-200-410	Infraction—Dismissal, when.
296-200-900	Fees.

DISPOSITION OF SECTIONS FORMERLY CODIFIED IN THIS CHAPTER

296-200-010	Certificate of registration—Initial application. [Order 74-16, § 296-200-010, filed 5/6/74. Formerly chapter 308-27 WAC.] Repealed by 81-21-001 (Order 81-25), filed 10/8/81. Statutory Authority: RCW 18.27.040.
296-200-020	Reregistration, renewal and reinstatement. [Order 74-16, § 296-200-020, filed 5/6/74. Formerly chapter 308-27 WAC.] Repealed by 81-21-001 (Order 81-25), filed 10/8/81. Statutory Authority: RCW 18.27.040.
296-200-030	Security and insurance requirements. [Order 74-16, § 296-200-030, filed 5/6/74. Formerly chapter 308-27 WAC.] Repealed by 81-21-001 (Order 81-25), filed 10/8/81. Statutory Authority: RCW 18.27.040.

Reviser's note: The department of labor and industries repealed department of motor vehicle chapter 308-27 WAC by their Order 74-16, filed in the office of the code reviser on May 6, 1974. The amendment and adoption of the revised rules were subsequently adopted as chapter 296-200 WAC.

WAC 296-200-005 Purpose of chapter. The contractor's registration law, chapter 18.27 RCW, is a valuable protection for persons who do business with contractors in Washington. In administering and interpreting the law, however, several problems have arisen. The contractors registration section cannot keep up with the paperwork the law entails. Many people are confused about the provisions in RCW 18.27.040 on suits against contractors and collection of judgments. Also, when a contractor and its bond are sued in several counties at the same time, problems arise over the priority of paying judgments from the bond. The intent of the rules in this chapter is to lessen the paperwork of the section and to clarify the confusing passages of the law. The rules are necessary to ensure that the law is efficiently and properly administered.

[Statutory Authority: RCW 18.27.040. 81-21-001 (Order 81-25), § 296-200-005, filed 10/8/81.]

WAC 296-200-015 Definitions. For the purposes of this chapter:

(1) "Bonded contractor" means a contractor who has obtained a surety bond in order to comply with RCW 18.27.040;

(2) "Department" means the department of labor and industries, and the division of building and construction safety inspection services;

(3) "Section" means the contractors registration section of the department;

(4) "Secured contractor" means a contractor who has assigned a savings account to the department or deposited cash or other security with the section in order to comply with RCW 18.27.040; and

(5) "Security" means a savings account assigned to the department or cash or other security deposited with the section;

(6) "Administrative law judge" means any person appointed by the chief administrative law judge, as defined in RCW 34.12.020(2) to preside at contested cases convened under RCW 18.27.100 or 18.27.200;

(7) "Contested case" means any proceeding coming before the department where an administrative law judge is empowered to determine legal rights, duties or privileges of specific parties on behalf of the director;

(8) "Director" means the director of the department of labor and industries or the designee of the director to act in place of the director;

(9) "Infraction" means an alleged violation of RCW 18.27.100 or 18.27.200 as cited by the chief construction compliance inspector, or the department's construction compliance inspectors at the direction of the chief construction compliance inspector;

(10) "Chief construction compliance inspector" means the person designated by the director to administer the activities of all personnel responsible for enforcement and administration of chapter 18.27 RCW.

[Statutory Authority: Chapter 18.27 RCW. 86-19-086 (Order 86-31), § 296-200-015, filed 9/17/86. Statutory Authority: RCW 18.27.040. 81-21-001 (Order 81-25), § 296-200-015, filed 10/8/81.]

WAC 296-200-025 Initial application for registration and renewal of registration. (1) A contractor may register if it:

(a) Completes an application for registration;

(b) Provides the information required by RCW 18.27.030;

(c) Obtains a surety bond, assigns a savings account to the department, or deposits cash or other security with the section. If a contractor obtains a bond, it must submit the original bond to the section (see RCW 18.27.040);

(d) Obtains public liability and property damage insurance, and submits a copy of the insurance certificate to the section (see RCW 18.27.050); and

(e) Pays a fee of \$40.00.

(2) The section shall send a renewal notice to a contractor's last recorded address at least 45 days before the contractor's registration expires. The contractor may renew its registration if it submits the renewal card and provides the materials required in paragraphs (1)(b), (c), (d), and (e).

(3) The contractor must submit all of the materials to the section in one package. Each of the materials must name the contractor exactly as it is named on the application for registration or the renewal card, as appropriate. If the contractor is renewing its registration, each of the materials must include the contractor's registration number. If any of the materials are missing, do not properly name the contractor, or do not include the registration number, the section shall refuse to register or renew the registration of the contractor.

(4) The contractor may request, in a letter filed with the application or renewal materials, that the registration period end on a particular day. The resulting registration period may not be longer than one year.

(5) When the section receives the required materials, it shall register or renew the registration of the contractor.

[Statutory Authority: RCW 18.27.020 and 18.27.070. 83-16-059 (Order 83-21), § 296-200-025, filed 8/2/83. Statutory Authority: RCW 18.27.040. 81-21-001 (Order 81-25), § 296-200-025, filed 10/8/81.]

WAC 296-200-035 Length of registration period.

If a contractor's bond or insurance will expire less than one year after the day the registration begins, the section shall require the contractor to accept a registration period that ends on the day the bond or insurance expires.

If the contractor wants a full one-year registration period, the contractor must obtain a short-term bond or insurance policy that will extend the bond or insurance coverage to the expiration date of the one-year registration period.

[Statutory Authority: RCW 18.27.040. 81-21-001 (Order 81-25), § 296-200-035, filed 10/8/81.]

WAC 296-200-040 Suspension of contractor's registration. A contractor can be registered only if it complies with the requirements of WAC 296-200-025. Therefore, if a contractor's surety bond or other security is impaired or cancelled, or if the contractor's insurance policy is cancelled, the section shall suspend the contractor's registration until the contractor obtains a new bond, other security, or insurance policy, or eliminates the impairment to the bond or other security. The contractor may not do business while its registration is suspended.

[Statutory Authority: RCW 18.27.040. 81-21-001 (Order 81-25), § 296-200-040, filed 10/8/81.]

WAC 296-200-050 Change in business structure, name, or address. (1) If a contractor changes its business structure (for example, if it changes from a partnership to a corporation, or if the partners in a partnership change), the contractor must apply for a new registration in the manner required by WAC 296-200-025. The new registration must be accompanied by a \$40.00 registration fee. If a contractor does not reregister after a change in its business structure, its registration may be invalid. See RCW 18.27.040.

(2) If a registered contractor changes its name or address it must notify the section of the change. The contractor must include a \$40.00 registration fee with the notification of a change in name.

[Statutory Authority: RCW 18.27.020 and 18.27.070. 83-16-059 (Order 83-21), § 296-200-050, filed 8/2/83. Statutory Authority: RCW 18.27.040, 42.17.290 and 42.17.300. 82-18-026 (Order 82-26), § 296-200-050, filed 8/25/82. Statutory Authority: RCW 18.27.040. 81-21-001 (Order 81-25), § 296-200-050, filed 10/8/81.]

WAC 296-200-060 Cancelling surety bonds and insurance policies. (1) A cancellation of a surety bond or insurance policy shall be effective 30 days after the section receives the cancellation notice, if the cancellation notice contains the following information:

- (a) The name of the contractor, exactly as it appears in the contractor's registration file;
- (b) The contractor's registration number;
- (c) The contractor's business address;
- (d) The names of the owners, partners, or officers of the contractor;
- (e) The bond or insurance policy number; and
- (f) The effective date of the bond or insurance policy.

To help the section process cancellations, the information should be given in the order shown.

(2) The insurance and bonding companies should send cancellation notices to the section by certified or registered mail.

[Statutory Authority: RCW 18.27.040. 81-21-001 (Order 81-25), § 296-200-060, filed 10/8/81.]

WAC 296-200-070 Refund of security deposited with the section. (1) If a contractor is secured, the section will release its interest in the security one year after the contractor's last registration expired. The section shall not release its interest, however, if an unsatisfied court judgment or claim is outstanding against the contractor.

(2) The section will release its interest in the security before one year has elapsed after the contractor's last registration period expired if the contractor provides a surety bond that covers both the contractor's previous and current registration periods.

[Statutory Authority: RCW 18.27.040. 81-21-001 (Order 81-25), § 296-200-070, filed 10/8/81.]

WAC 296-200-080 Filing suit against a contractor.

(1) All civil suits against a contractor for claims under chapter 18.27 RCW must be brought in superior court. In particular, if a secured contractor is sued, the section will be unable to pay an unsatisfied final judgment from the securities if the suit is not brought in superior court.

(2) If a claimant sues a contractor, the claimant shall serve the summons and complaint on the contractor and its bonding company by serving three copies of the summons and complaint by registered or certified mail on the section. The section shall not accept personal service of the summons and complaint.

(3) The section may be unable to process a summons and complaint if the summons and complaint do not contain the following information:

- (a) The name of the contractor, exactly as it appears in the contractor's registration file;
- (b) The contractor's business address;
- (c) The names of the owners, partners, or officers of the contractor; and
- (d) The contractor's license number.

If the suit joins a bonding company, the summons and complaint should also include:

- (e) The name of the bonding company that issued the contractor's bond;
- (f) The bond number; and
- (g) The effective date of the bond.

If the information is insufficient for the section to identify that contractor or bonding company that is being sued, the section will not attempt to serve the summons and complaint and will return them to the claimant.

[Statutory Authority: Chapter 18.27 RCW. 86-19-086 (Order 86-31), § 296-200-080, filed 9/17/86. Statutory Authority: RCW 18.27.040. 81-21-001 (Order 81-25), § 296-200-080, filed 10/8/81.]

WAC 296-200-090 Collection of judgments. (1) If a contractor is secured, a claimant who has received a final judgment against the contractor from a superior court may satisfy the judgment out of the security held by the section. The section cannot satisfy a district court judgment.

(2) The section shall satisfy a superior court final judgment if the claimant services on the section, by registered or certified mail, three certified copies of the unsatisfied judgment within one year of the date the judgment was entered. The claimant must include the following information with the copies of the judgment:

- (a) The name of the contractor, exactly as it appears in the contractor's registration file;
- (b) The contractor's business address;
- (c) The names of the owners, partners, or officers of the contractor;
- (d) The contractor's license number; and
- (e) The exact amount of the judgment awarded by the superior court, including attorneys fees and interest.

If the section does not receive sufficient information to enable it to pay the judgment, it shall inform the claimant that more information is needed.

(3) If a contractor is bonded, a claimant who has received a final judgment against the contractor can satisfy the judgment against the contractor or the bonding company only. The section can neither satisfy the judgment nor force the contractor or the bonding company to pay the judgment. The claimant must join the bonding company in the suit if it wants the bonding company to pay the judgment.

[Statutory Authority: RCW 18.27.040. 81-21-001 (Order 81-25), § 296-200-090, filed 10/8/81.]

WAC 296-200-100 Priority for payment of judgments. RCW 18.27.040 contains two different provisions for priority in paying judgments from the contractor's bond or security.

(1) If a contractor is secured, the section shall satisfy final judgments against the contractor in the order the section receives the judgments.

(2) If a contractor is bonded, the priority for paying judgments from the bond is not a race priority such as the priority for payment of judgments against a security contractor. Instead, it is similar to the priority in bankruptcies. Claims for labor and employee benefits are satisfied first; claims for breach of contract are satisfied second; material and equipment claims are third; claims for taxes and contributions to the state of Washington are fourth; and claims for court costs, interest, and attorneys fees are satisfied last. No claim in a lesser category may be satisfied until all claims in the preceding categories are satisfied unless the total amount of all claims in the preceding categories is less than the amount of the bond that remains unimpaired.

[Statutory Authority: RCW 18.27.040. 82-24-057 (Order 82-35), § 296-200-100, filed 12/1/82; 81-21-001 (Order 81-25), § 296-200-100, filed 10/8/81.]

WAC 296-200-110 Verification of registration number by a city, town, or county. Verification of the contractor registration number for the purpose of issuing a building permit shall mean verification only of the registration of the general or specialty contractor who is applying for the building permit.

[Statutory Authority: RCW 18.27.125. 93-23-043, § 296-200-110, filed 11/12/93, effective 12/13/93.]

WAC 296-200-111 Verification of nonoriginal registration card by city, town, or county. A city, town, or county may accept, for the purposes of verification, a copy of the original contractor registration card, which has been attested to by the person who applied for that original registration card and which is notarized.

[Statutory Authority: RCW 18.27.125. 93-23-043, § 296-200-111, filed 11/12/93, effective 12/13/93.]

WAC 296-200-112 Liability to cities, towns, and counties for failure to verify contractor registration. Failure to verify the contractor's registration number will result in liability, for the penalty amount specified in RCW 18.27.100 (6)(a), only to the city, town, or county that issued the building permit.

[Statutory Authority: RCW 18.27.125. 93-23-043, § 296-200-112, filed 11/12/93, effective 12/13/93.]

WAC 296-200-300 Procedures for issuance of notices of infraction. The department may issue a notice of infraction to a contractor that violates RCW 18.27.100 or 18.27.200. The chief construction compliance inspector shall direct that notices of infraction contain the following when issued:

(1) A statement that the notice represents a determination that the infraction has been committed by the contractor named in the notice and that the determination shall be final unless contested;

(2) A statement that the infraction is a noncriminal offense for which imprisonment shall not be imposed as a sanction;

(3) A statement of the specific violation which necessitated issuance of the infraction;

(4) A statement of the penalty involved if the infraction is established;

(5) A statement informing the contractor of the right to a contested hearing conducted pursuant to chapter 34.04 RCW if requested within twenty days of receipt of the infraction;

(6) A statement that at any hearing to contest the notice of infraction the state has the burden of proving, by a preponderance of the evidence, that the infraction was committed, and that the contractor may subpoena witnesses including the compliance inspector that issued the notice of infraction;

(7) A statement notifying the party issued or served the notice of infraction that he is required to sign the notice of infraction which has the effect of establishing that the contractor promises to respond to the notice of infraction as provided in chapter 18.27 RCW;

(8) A statement notifying the contractor that a refusal to sign the notice of infraction is a misdemeanor and may be punishable by fine or imprisonment in jail, and that failure to respond to a notice of infraction as promised by the contractor may be punished by a fine or imprisonment in jail.

[Statutory Authority: Chapter 18.27 RCW. 86-19-086 (Order 86-31), § 296-200-300, filed 9/17/86. Statutory Authority: RCW 18.27.040, 18.27.200 and 18.106.020. 84-12-018 (Order 84-08), § 296-200-300, filed 5/25/84.]

WAC 296-200-310 Service on employee of a contractor. If a contractor is a corporation or a partnership, the department need not serve the contractor personally. In such a case, if no owner, officer, or partner of a violating contractor is on a job site, the department may issue a notice of infraction to any employee on the site. For purposes of serving the notice of infraction, the legislature intended that all employees of a contractor, at whatever level, are authorized to act as, and are, agents to accept service of the notice of infraction on behalf of the contractor. A promise to appear signed by an employee on behalf of the contractor is binding on the contractor. To lessen possible problems, however, the department shall have the employee complete the promise to appear on the notice of infraction in the following fashion: The employee shall sign the "name of the contractor, by name of the employee." It will appear thus:

Jane Doe Construction Co.
(by) Richard Roe, Employee.

[Statutory Authority: RCW 18.27.040, 18.27.200 and 18.106.020. 84-12-018 (Order 84-08), § 296-200-310, filed 5/25/84.]

WAC 296-200-320 Mailing copy of notice of infraction to contractor. If the department serves a notice of infraction on an employee of a contractor, and not on the owner, officer, or partner of the contractor, the law requires the department to mail by certified mail a copy of the notice of infraction to the contractor if the department can determine the contractor's name and address. If the department cannot determine the contractor's name and address, it need not mail a copy of the notice of infraction; in such a case, the notice of infraction shall remain valid. To ensure further that the contractor receives a copy, the department shall, as well as mail a copy by certified mail, mail a second copy by ordinary mail.

[Statutory Authority: Chapter 18.27 RCW. 86-19-086 (Order 86-31), § 296-200-320, filed 9/17/86. Statutory Authority: RCW 18.27.040, 18.27.200 and 18.106.020. 84-12-018 (Order 84-08), § 296-200-320, filed 5/25/84.]

WAC 296-200-330 Issuance of notices of infraction under RCW 18.27.100 or 18.27.200. The department may issue a notice of infraction if the department reasonably believes that the contractor required to be registered has failed to do so.

(1) A notice of infraction issued under this section shall be served personally on the contractor named in the notice by the department's compliance inspectors.

(2) If a notice of infraction is personally served upon an employee of a firm or corporation, the department shall within four days of service send a copy of the notice by certified mail to the contractor if the department is able to obtain the contractor's address.

(3) Constructive service may be made by certified mail directed to the contractor named in the notice of infraction.

[Statutory Authority: Chapter 18.27 RCW. 86-19-086 (Order 86-31), § 296-200-330, filed 9/17/86.]

WAC 296-200-340 Right to contested hearing—Place to file. If a contractor desires to contest the notice of infraction issued, the contractor shall file two copies of a notice of appeal with the department at the office designated

on the notice of infraction, within twenty days of issuance of the infraction. The contractor shall also be required to post an appeal bond of two hundred dollars with the notice of appeal payable to the department. The appeal bond shall be applied to the administrative costs of conducting the appeals of notices of infractions. If the appealing contractor prevails at a contested hearing, then the appeal bond shall be returned to the contractor.

[Statutory Authority: Chapter 18.27 RCW. 87-07-003 (Order 87-08), § 296-200-340, filed 3/5/87; 86-19-086 (Order 86-31), § 296-200-340, filed 9/17/86.]

WAC 296-200-350 Administrative law judge shall preside in contested hearings. A notice of infraction when contested, shall be heard before and determined by an administrative law judge from the office of administrative hearings. The administrative law judge shall conduct hearings in these cases at locations in the county where the infraction occurred. The parties shall have the right to apply to the administrative law judge for a change of venue where the interests of justice would be served.

[Statutory Authority: Chapter 18.27 RCW. 87-07-003 (Order 87-08), § 296-200-350, filed 3/5/87; 86-19-086 (Order 86-31), § 296-200-350, filed 9/17/86.]

WAC 296-200-360 Representation by counsel. Contractors may appear before the administrative law judge through counsel, or may represent themselves. The department shall be represented by the attorney general.

[Statutory Authority: Chapter 18.27 RCW. 86-19-086 (Order 86-31), § 296-200-360, filed 9/17/86.]

WAC 296-200-370 Contested cases—Notice—Hearing—Summary orders—Informal disposition—Record—Findings of fact. The hearings shall be conducted in accordance with chapter 34.04 RCW and chapter 10-08 WAC.

(1) An appeal from the administrative law judges' determination or order shall be to the superior court pursuant to chapter 34.04 RCW.

[Statutory Authority: Chapter 18.27 RCW. 87-07-003 (Order 87-08), § 296-200-370, filed 3/5/87; 86-19-086 (Order 86-31), § 296-200-370, filed 9/17/86.]

WAC 296-200-380 Contested cases—Evidence. All relevant evidence shall be admissible in contested hearings convened pursuant to RCW 18.27.100 and 18.27.200. Admission of evidence is further subject to RCW 34.04.100 and 34.04.105 of the Administrative Procedure Act of Washington.

[Statutory Authority: Chapter 18.27 RCW. 86-19-086 (Order 86-31), § 296-200-380, filed 9/17/86.]

WAC 296-200-390 Administration of appeals. The department shall record and forward all appeals of notices of infraction received to the office of administrative hearings.

[Statutory Authority: Chapter 18.27 RCW. 86-19-086 (Order 86-31), § 296-200-390, filed 9/17/86.]

WAC 296-200-400 Fines. A contractor found to have committed an infraction under RCW 18.27.200 shall be assessed the minimum penalty of a fine of two hundred dollars for the first noncompliance violation. A cited unregistered contractor that continues to do work as a contractor, and is cited for same, shall be subject to twice the amount of the last issued infraction, up to the maximum fine of three thousand dollars as provided in chapter 18.27 RCW.

[Statutory Authority: Chapter 18.27 RCW. 86-19-086 (Order 86-31), § 296-200-400, filed 9/17/86.]

WAC 296-200-410 Infraction—Dismissal, when. The court shall dismiss the notice of infraction at any time upon written notification from the department that the contractor named in the notice of infraction was registered at the time the notice of infraction was issued.

[Statutory Authority: Chapter 18.27 RCW. 86-19-086 (Order 86-31), § 296-200-410, filed 9/17/86.]

WAC 296-200-900 Fees. (1) The department shall charge a \$40.00 fee for each registration and renewal of registration. For purposes of this rule, a contractor renews its registration after its registration expires, or after the registration has been suspended because the contractor's bond or insurance has been cancelled. The department shall charge \$10.00 for providing a duplicate certificate of registration.

(2) The department will charge \$2.00 per copy for documents from a contractor's file. The department shall not charge more than a total of \$24.00 for copies from one contractor's file.

[Statutory Authority: RCW 18.27.020 and 18.27.070. 83-16-059 (Order 83-21), § 296-200-900, filed 8/2/83. Statutory Authority: RCW 18.27.040, 42.17.290 and 42.17.300. 82-18-026 (Order 82-26), § 296-200-900, filed 8/25/82. Statutory Authority: RCW 18.27.040. 81-21-001 (Order 81-25), § 296-200-900, filed 10/8/81.]

Chapter 296-301 WAC SAFETY STANDARDS FOR THE TEXTILE INDUSTRY

WAC

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WAC 296-301-010 Textiles—Application requirements. (1) Application. The requirements of this chapter for textile safety apply to the design, installation, processes, operation, and maintenance of textile machinery, equipment, and other plant facilities in all plants engaged in the manufacture and processing of textiles, except those processes used exclusively in the manufacture of synthetic fibers.

(2) These standards shall be augmented by the Washington state general safety and health standards, and any other regulations of general application which are or will be made applicable to all industries.

(3) The provisions of this chapter shall prevail in the event of conflict with or duplication of, provisions contained in chapter 296-24 WAC, the general safety and health standards and chapter 296-62 WAC, the general occupational health standards.

(4) WAC 296-24-006 through 296-24-012 of the general safety and health standards, shall apply where applicable to this industry.

[Order 74-19, § 296-301-010, filed 5/6/74.]

WAC 296-301-015 Definitions applicable to this chapter. (1) "Belt shifter" means a device for mechanically shifting a belt from one pulley to another.

(2) "Belt shifter lock" means a device for positively locking the belt shifter in position while the machine is stopped and the belt is idling on the loose pulleys.

(3) "Calendar" means a machine consisting of a set of heavy rollers mounted on vertical side frames and arranged to pass cloth between them. Calendars may have two to ten rollers, or bowls, some of which can be heated.

(4) "Embossing calender" means a calender with two or more rolls, one of which is engraved for producing figured effects of various kinds on a fabric.

(5) "Cans (drying)" means hollow cylindrical drums mounted in a frame so they can rotate. They are heated with steam and are used to dry fabrics or yarn as it passes around the perimeter of the can.

(6) "Carbonizing" means the removing of vegetable matter such as burns, straws, etc., from wool by treatment with acid, followed by heat. The undesired matter is reduced to a carbon-like form which may be removed by dusting or shaking.

(7) "Card" machine means a machine consisting of cylinders of various sizes—and in certain cases flats—covered with card clothing and set in relation to each other so that fibers in staple form may be separated into individual relationship. The speed of the cylinders and their direction of rotation varies. The finished product is delivered as a sliver. Cards of different types are: The revolving flat card, the roller-and-clearer card, etc.

(8) "Card clothing" means the material with which many of the surfaces of a card are covered; e.g., the cylinder, doffer, etc. It consists of a thick foundation material, usually made of textile fabrics, through which are pressed many fine, closely spaced, specially bent wires.

(9) "Comber" means a machine for combing fibers of cotton, wool, etc. The essential parts are a device for feeding forward a fringe of fibers at regular intervals and an arrangement of combs or pins which, at the right time, pass through the fringe. All tangled fibers, short fibers, and neps are removed and the long fibers are laid parallel.

(10) "Combing machinery" means a general classification, including combers, sliver lap machines, ribbon lap machines, and gill boxes, but excluding cards.

(11) "Cutter (rotary staple)" means a machine consisting of one or more rotary blades used for the purpose of cutting textile fibers into staple lengths.

(12) "Exposed to contact" means that the location of an object, material, nip point, or point of operation is such that a person is liable to come in contact with it in his normal course of employment.

(13) "Garnett machine" means any of a number of types of machines for opening hard twisted waste of wool, cotton, silk, etc. Essentially, such machines consist of a lickerin; one or more cylinders, each having a complement worker and stripper rolls; and a fancy roll and doffer. The action of such machines is somewhat like that of a wool card, but it is much more severe in that the various rolls are covered with garnett wire instead of card clothing.

(14) "Gill box" means a machine used in the worsted system of manufacturing yarns. Its function is to arrange the fibers in parallel order. Essentially, it consists of a pair of feed rolls and a series of followers where the followers move at a faster surface speed and perform a combing action.

(15) "Interlock" means a device that operates to prevent the operation of machine while the cover or door of the machine is open or unlocked, and which will also hold the cover or door closed and locked while the machine is in motion.

(16) "Jig (dye)" means a machine for dyeing piece goods. The cloth, at full width, passes from a roller through the dye liquor in an open vat and is then wound on another roller. The operation is repeated until the desired shade is obtained.

(17) "Kier" means a large metal vat, usually a pressure type, in which fabrics may be boiled out, bleached, etc.

(18) "Lapper (ribbon)" means a machine used to prepare laps for feeding a cotton comb; its purpose is to provide a

uniform lap in which the fibers have been straightened as much as possible.

(19) "Lapper (sliver)" means a machine in which a number of parallel card slivers are drafted slightly, laid side by side in a compact sheet, and wound into a cylindrical package.

(20) "Loom" means a machine for effecting the interlacing of two series of yarns crossing one another at right angles. The warp yarns are wound on a warp beam and pass through heddles and reed. The filling is shot across in a shuttle and settled in place by reed and lay, and the fabric is wound on a cloth beam.

(21) "Starch mangle" means a mangle that is used specifically for starching cotton goods. It commonly consists of two large rolls and a shallow open vat with several immersion rolls. The vat contains the starch solution.

(22) "Water mangle" means a calender having two or more rolls used for squeezing water from fabrics before drying. Water mangles also may be used in other ways during the finishing of various fabrics.

(23) "Mule" means a type of spinning frame having a head stock and a carriage as its two main sections. The head stock is stationary. The carriage is movable and it carries the spindles which draft and spin the roving into the yarn. The carriage extends over the whole width of the machine and moves slowly toward and away from the head stock during the spinning operation.

(24) "Nip" means the point of contact between two in-running rolls.

(25) "Openers and pickers" means a general classification which includes breaker pickers, intermediate pickers, finisher pickers, single process pickers, multiple process pickers, willow machines, card and picker waste cleaners, thread extractors, shredding machines, roving waste openers, shoddy pickers, bale breakers, feeders, vertical openers, lattice cleaners, horizontal cleaners, and any similar machinery equipped with either cylinders, screen section, calender section, rolls, or beaters used for the preparation of stock for further processing.

(26) "Paddler" means equipment consisting of a trough for a solution and two or more squeeze rolls between which cloth passes after being passed through a mordant or dye bath.

(27) "Point of operation" means that part of the machine where the work of cutting, shearing, squeezing, drawing, or manipulating the stock in any other way is done.

(28) "Roller printing machine" means a machine consisting of a large central cylinder, or pressure bowl, around the lower part of the perimeter of which is placed a series of engraved color rollers (each having a color trough), a furnisher roller, doctor blades, etc. The machine is used for printing fabrics.

(29) "Continuous bleaching ranges" means ranges of several types and may be made for cloth in rope or open-width form. The goods, after wetting out, pass through a squeeze roll into a saturator containing a solution of caustic soda and then to an enclosed J-box. A V-shaped arrangement is attached to the front part of the J-box for uniform and rapid saturation of the cloth with steam before it is packed down in the J-box. The cloth, in a single strand rope form, passes over a guide roll down the first arm of the "V"

and up the second. Steam is injected into the "V" at the upper end of the second arm so that the cloth is rapidly saturated with steam at this point. The J-box capacity is such that cloth will remain hot for a sufficient time to complete the scouring action. It then passes a series of washers with a squeeze roll in between. The cloth then passes through a second set of saturator, J-box, and washer, where it is treated with the peroxide solution. By slight modification of the form of the unit, the same process can be applied to open-width cloth.

(30) "Mercerizing range" generally means a 3-bowl mangle, a tenter frame, and a number of boxes for washing and scouring. The whole setup is in a straight line and all parts operate continuously. The combination is used to saturate the cloth with sodium hydroxide, stretch it while saturated, and washing out most of the caustic before releasing tension.

(31) "Sanforizing machine" means a machine consisting of a large steam-heated cylinder, an endless, thick, woolen felt blanket which is in close contact with the cylinder for most of its perimeter, and an electrically heated shoe which presses the cloth against the blanket while the latter is in a stretched condition as it curves around feed-in roll.

(32) "Shearing machine" means a machine used in shearing cloth. Cutting action is provided by a number of steel blades spirally mounted on a roller. The roller rotates in close contact with a fixed ledger blade. There may be from one to six such rollers on a machine.

(33) "Singeing machine" means a machine used particularly with cotton, comprised of a heated roller, plate, or an open gas flame. The material is rapidly passed over the roller or the plate or through the open gas flame to remove fuzz or hairiness on yarn or cloth by burning.

(34) "Slasher" means a machine used for applying a size mixture to warp yarns. Essentially, it consists of a stand for holding section beams, a size box, one or more cylindrical dryers or an enclosed hot air dryer, and a beaming end for finding the yarn on the loom beams.

(35) "Industrial organic solvent" means any organic volatile liquid or compound, or any combination of these substances which are used to dissolve or suspend a nonvolatile or slightly volatile substance for industrial utilization. It shall also apply to such substances when used as detergents or cleansing agents. It shall not apply to petroleum products when such products are used as fuel.

(36) "Tenter frame" means a machine for drying cloth under tension. It essentially consists of a pair of endless traveling chains fitted with clips of fine pins and carried on tracks. The cloth is firmly held at the selvages by the two chains which diverge as they move forward so that the cloth is brought to the desired width.

(37) "Warper" means any machine for preparing and arranging the yarns intended for the warp of a fabric, specifically, a beam warper.

[Order 74-19, § 296-301-015, filed 5/6/74.]

WAC 296-301-020 General safety requirements. (1) Means of stopping machines. Every textile machine shall be provided with individual mechanical or electrical means for stopping such machines. On machines driven by belts and shafting a locking-type shifter or an equivalent positive

device shall be used. On operations where injury to the operator might result if motors were to restart after power failures, provision shall be made to prevent machines from automatically restarting upon restoration of power.

(2) Handles. Stopping and starting handles shall be designed to the proper length to prevent the worker's hand or fingers from striking against any revolving part, gear guard, or any other part of the machine.

(3) Machine guarding. Mechanical power-transmission equipment shall be guarded in conformity with WAC 296-24-205 through 296-24-20531, of the general safety and health standards.

(4) Housekeeping. Aisles and working spaces shall be kept in good order, clean and free of obstructions in accordance with requirements of WAC 296-24-120 through 296-24-12015, of the general safety and health standards.

(5) Inspection and maintenance. All guards and other safety devices, including starting and stopping devices, shall be properly maintained.

(6) Lighting and illumination. Lighting and illumination shall conform to the general occupational health standards, chapter 296-62 WAC.

(7) Identification of piping systems. Identification of piping systems shall conform to American National Standard A13.1-1956.

(8) Identification of physical hazards. Identification of physical hazards shall be in accordance with the requirements of WAC 296-24-135 through 296-24-13503, of the general safety and health standards.

(9) Steam pipes. All pipes carrying steam or hot water for process or servicing machinery, when exposed to contact and located within seven feet of the floor or working platform shall be covered with a heat-insulating material, or guarded with equivalent protection.

[Order 74-19, § 296-301-020, filed 5/6/74.]

WAC 296-301-025 Openers and pickers. (1) Beater guards. When any opening or picker machinery is equipped with a beater, such beater shall be provided with metal covers which will prevent contact with the beater. Such covers shall be provided with an interlock which will prevent the cover from being raised while the machine is in motion and prevent the operation of the machine while the cover is open.

(2) Cleanout holes. Cleanout holes within reaching distance of the fan or picker beater shall have their covers securely fastened and they shall not be opened while the machine is in motion.

(3) Feed rolls. The feed rolls on all opening and picking machinery shall be covered with a guard designed to prevent the operator from reaching the nip while the machinery is in operation.

(4) Removal of foreign ferrous material. All textile opener lines shall be equipped with magnetic separators, tramp iron separators, or other means for the removal of foreign ferrous material.

[Order 74-19, § 296-301-025, filed 5/6/74.]

WAC 296-301-030 Cotton cards. (1) Enclosures. Cylinder and lickerins shall be equipped with guards and the doffers should be enclosed.

(2) Enclosure fastenings. The enclosures or covers shall be kept in place while the machine is in operation, except when stripping or grinding.

(3) Stripping rolls. On operations calling for flat strippings which are allowed to fall on the doffer cover, where such strippings are removed by hand, the doffer cover shall be kept closed and securely fastened to prevent the opening of the cover while the machine is in operation. When it becomes necessary to clean the cards while they are in motion, a long-handled brush or dust mop shall be used.

[Order 74-19, § 296-301-030, filed 5/6/74.]

WAC 296-301-035 Garnett machines. (1) Lickerin. Garnett lickerins shall be enclosed.

(2) Fancy rolls. Garnett fancy rolls shall be enclosed by covers. These shall be installed in a way that keeps worker rolls reasonably accessible for removal or adjustment.

(3) Underside of machine. The underside of the garnett shall be guarded by a screen mesh or other form of enclosure to prevent access while machine is running.

[Order 74-19, § 296-301-035, filed 5/6/74.]

WAC 296-301-040 Spinning mules. A substantial fender of metal or hardwood shall be installed in front of the carriage wheels, the fender to extend to within one-fourth inch of the rail.

[Order 74-19, § 296-301-040, filed 5/6/74.]

WAC 296-301-045 Slashers—Scope and application. All sections of this chapter which include WAC 296-301-045 in the section number apply to slashers.

[Order 74-19, § 296-301-045, filed 5/6/74.]

WAC 296-301-04501 Cylinder dryers. (1) Reducing valves, safety valves, and pressure gages. Reducing valves, safety valves, and pressure gages shall conform to the ASME Pressure Vessel Code, section VIII, Unfired Pressure Vessels, 1968.

(2) Vacuum relief valves. Vacuum relief valves shall conform to the ASME Code for Pressure Vessels, section VIII, Unfired Pressure Vessels, 1968.

(3) Lever control. When slashers are operated by control levers, these levers shall be connected to a horizontal bar or treadle located not more than 69 inches above the floor to control the operation from any point.

(4) Pushbutton control. Slashers operated by pushbutton control shall have stop and start buttons located at each end of the machine, and additional buttons located on both sides of the machine, at the size box and the delivery end. If calender rolls are used, additional buttons shall be provided at both sides of the machine at points near the nips, except when slashers are equipped with an enclosed dryer.

(5) Nip guards. All nip guards shall comply with the requirements of WAC 296-301-04503(4).

(6) Cylinder enclosure. When enclosures or hoods are used over cylinder drying rolls, such enclosures or hoods shall be provided with an exhaust system which will effectively prevent wet air and steam from escaping into the workroom.

(7) Expansion chambers. Slasher kettles and cookers shall be provided with expansion chambers in the covers, or drains, to prevent surging over. Steam-control valves shall be so located that they can be operated without exposing the worker to moving parts, hot surfaces, or steam.

[Order 74-19, § 296-301-04501, filed 5/6/74.]

WAC 296-301-04503 Enclosed hot air dryers. (1) Lever control. When slashers are operated by control levers, these levers shall be connected to a horizontal bar or treadle located not more than 69 inches above the floor to control the operation from any point.

(2) Push-button control. Slashers operated by push-button control shall have one start button at each end of the machine and stop buttons shall be located on both sides of the machines at intervals spaced not more than 6 feet on centers.

Note: Inching buttons should be installed.

(3) Dryer enclosure. The dryer enclosure shall be provided with an exhaust system which will effectively prevent wet air and steam from escaping into the workroom.

(4) Nip guards. All nip guards shall comply with Table R-1.

TABLE R-1
GUARD OPENINGS

Openings in the guard or between the guard and working surface shall not be greater than the following:

Distance of opening from nip point	Maximum width of opening
0 to 1 1/2	1/4
1 1/2 to 2 1/2	3/8
2 1/2 to 3 1/2	1/2
3 1/2 to 5 1/2	5/8
5 1/2 to 6 1/2	3/4
6 1/2 to 7 1/2	7/8
7 1/2 to 8 1/2	1 1/4

The measurements in Table R-1 are all in inches.

(5) Expansion chambers. Slasher kettles and cookers shall be provided with expansion chambers in the covers, or drains, to prevent surging over. Steam control valves shall be so located that they can be operated without exposing the worker to moving parts, hot surfaces, or steam.

[Order 74-19, § 296-301-04503, filed 5/6/74.]

WAC 296-301-050 Warpers. (1) Swiveled double-bar gates. Swiveled double-bar gates shall be installed on all warpers operating in excess of 450 yards per minute. These gates shall be so interlocked that the machine cannot be operated until the gate is in the "closed position," except for the purpose of inching or jogging.

(2) Closed position. "Closed position" shall mean that the top bar of the gate shall be at least 42 inches from the floor or working platform; and the lower bar shall be at least 21 inches from the floor or working platform; and the gate shall be located 15 inches from the vertical tangent to the beam head.

[Order 74-19, § 296-301-050, filed 5/6/74.]

WAC 296-301-055 Drawing frames, slubbers, roving parts, cotton combers, ring spinning frames, twisters. Gear housing covers on all installations of drawing frames, slubbers, roving frames, cotton combers, ring spinning frames, and twisters shall be equipped with interlocks.

[Order 74-19, § 296-301-055, filed 5/6/74.]

WAC 296-301-060 Gill boxes. (1) Pin guard. A guard shall be placed ahead of the feed end and shall be so designed that it will prevent the worker's fingers from being caught in the pins of the intersecting fallers.

(2) Nip guards. All nip guards shall comply with the requirements of WAC 296-301-04503(4).

[Order 74-19, § 296-301-060, filed 5/6/74.]

WAC 296-301-065 Heavy draw boxes, finishers, and speeders used in worsted drawing. (1) Band pulley covers. Covers for band pulleys shall be closed when the machine is in motion.

(2) Benches or working platforms. Benches or working platforms approximately 10 inches in height and 8 inches in width should be installed along the entire running length of the machine for the worker to stand on while creeling the machine. Such benches or platforms shall be covered with an abrasive or nonslip material.

[Order 74-19, § 296-301-065, filed 5/6/74.]

WAC 296-301-070 Silver and ribbon lappers (cotton). Cover guard. An interlocking cover guard shall be installed over the large calender drums and the lap spool, designed to prevent the operator from coming in contact with the nip.

[Order 74-19, § 296-301-070, filed 5/6/74.]

WAC 296-301-075 Looms. (1) Shuttle guard. Each loom shall be equipped with a guard designed to minimize the danger of the shuttle flying out of the shed.

(2) Protection for loom fixer. Provisions shall be made so that every loom fixer can prevent the loom from being started while he is at work on the loom. This may be accomplished by means of a lock, the key to which is retained in the possession of the loom fixer, or by some other effective means to prevent starting the loom.

[Order 74-19, § 296-301-075, filed 5/6/74.]

WAC 296-301-080 Shearing machines. All revolving blades on shearing machines shall be guarded so that the opening between the cloth surface and the bottom of the guard will not exceed three-eighths inch.

[Order 74-19, § 296-301-080, filed 5/6/74.]

WAC 296-301-085 Continuous bleach range (cotton and rayon). (1) J-box protection. Each valve controlling the flow of steam, injurious gases, or liquids into a J-box shall be equipped with a chain, lock, and key, so that any worker who enters the J-box can lock the valve and retain the key in his possession. Any other method which will prevent steam, injurious gases, or liquids from entering the

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J-box while the worker is in it will comply with this provision.

(2) Open-width bleaching. The nip of all in-running rolls on open-width bleaching machine rolls shall be protected with a guard to prevent the worker from being caught at the nip. The guard shall extend across the entire length of the nip.

[Order 74-19, § 296-301-085, filed 5/6/74.]

WAC 296-301-090 Kiers. (1) Reducing valves, safety valves, and pressure gages. Reducing valves, safety valves, and pressure gages shall conform to the ASME Code for Unfired Pressure Vessels, section VIII, Unfired Pressure Vessels, 1968.

(2) Kier valve protection. Each valve controlling the flow of steam, injurious gases, or liquids into a kier shall be equipped with a chain, lock, and key, so that any worker who enters the kier can lock the valve and retains the key. Any other method which will prevent steam, injurious gases, or liquids from entering the kier while the worker is in it will be acceptable.

[Order 74-19, § 296-301-090, filed 5/6/74.]

WAC 296-301-095 Gray and white bins. Guard rails conforming to WAC 296-24-750 through 296-24-75011, of the general safety and health standards, shall be provided where workers are required to plait by hand from the top of the bin so as to protect the worker from falling to a lower level.

[Order 74-19, § 296-301-095, filed 5/6/74.]

WAC 296-301-100 Mercerizing range (piece goods). (1) Stopping devices. A stopping device shall be provided at each end of the machine.

(2) Frame ends. A guard shall be installed at each end of the frame between the in-running chain and the clip opener, to prevent the worker's fingers from being caught.

(3) Mangle and washers. The nip at the in-running rolls shall conform to WAC 296-301-04503(4).

[Order 74-19, § 296-301-100, filed 5/6/74.]

WAC 296-301-105 Tenter frames. (1) Stopping devices. A stopping device shall be provided at each end of the machine.

(2) Frame ends. A guard shall be installed at each end of the frame at the in-running chain and clip opener.

(3) Oil cups. Oil cups shall be located to permit safe and easy access. They shall be of the extension type to permit oiling while machines are operating.

[Order 74-19, § 296-301-105, filed 5/6/74.]

WAC 296-301-110 Dyeing jigs. (1) Stopping devices. Each dye jig shall be equipped with individual mechanical or electrical means for stopping the machine.

(2) Roll arms. Roll arms on jigs shall be built to allow for extra large batches, and to prevent the center bar from being forced off, causing the batch to fall.

[Order 74-19, § 296-301-110, filed 5/6/74.]

WAC 296-301-115 Padders—Nip guards. All nip guards shall comply with the requirements of WAC 296-301-04503(4).

[Order 74-19, § 296-301-115, filed 5/6/74.]

WAC 296-301-120 Drying cans. (1) Pressure reducing valves and pressure gages. Pressure reducing valves and pressure gages shall conform to the ASME Code for Pressure Vessels, section VIII, 1968, Unfired Pressure Vessels.

(2) Vacuum collapse. If cans are not designed to prevent vacuum collapse, each can shall be equipped with one or more vacuum relief valves with openings of such a size as to prevent the collapse of the can if vacuum occurs.

[Order 74-19, § 296-301-120, filed 5/6/74.]

WAC 296-301-125 Ironer. (1) Each flat-work or collar ironer shall be equipped with a safety bar or other guard across the entire front of the feed or first pressure rolls, so arranged that the striking of the bar or guard by the hand of the operator or other person will stop the machine. The pressure rolls shall be covered or guarded so that the operator or other person cannot reach into the rolls without removing the guard. This may be either a vertical guard on all sides or a complete cover. If a vertical guard is used, the distance from the floor or working platform to the top of guard shall be not less than 6 feet.

[Order 74-19, § 296-301-125, filed 5/6/74.]

WAC 296-301-130 Extractors. (1) Centrifugal extractor.

(a) Cover. Each extractor shall be equipped with a metal cover.

(b) Interlocking device. Each extractor shall be equipped with an interlocking device that will prevent the cover from being opened while the basket is in motion, and also prevent the power operation of the basket while the cover is open.

(c) Brakes. Each extractor shall be equipped with a mechanically or electrically operated brake to quickly stop the basket when the power driving the basket is shut off.

(d) Maximum allowable speed. Each centrifugal extractor shall be effectively secured in position on the floor or foundation so as to eliminate unnecessary vibration, and shall not be operated at a speed greater than the manufacturer's rating, which shall be stamped where easily visible in letters not less than one-quarter inch in height. The maximum allowable speed shall be given in revolutions per minute (rpm).

(2) Engine drum extractor—Over-speed governor. Each engine individually driving an extractor shall be provided with an engine stop approved as specified in WAC 296-24-006, of the general safety and health standards, and a speed limit governor.

(3) Squeezer or wringer extractor—Nip guards. All nip guards shall comply with the requirements of WAC 296-301-04503(4).

[Order 74-19, § 296-301-130, filed 5/6/74.]

WAC 296-301-135 Nip guards. All nip guards for water mangle, starch mangle, backwasher (worsted yarn) crabbing machines, decating machines, shall comply with the requirements of WAC 296-301-04503(4).

[Order 74-19, § 296-301-135, filed 5/6/74.]

WAC 296-301-140 Sanforizing and palmer machine. A safety trip rod, cable, or wire center cord shall be provided across the front and back of all palmer cylinders extending the length of the face of the cylinder. It shall operate readily whether pushed or pulled. This safety trip shall be not more than 72 inches above the level on which the operator stands and shall be readily accessible.

[Order 74-19, § 296-301-140, filed 5/6/74.]

WAC 296-301-145 Rope washers. (1) Splash guard. Splash guards shall be installed on all rope washers unless the machine is so designed as to prevent the water or liquid from splashing the operator, the floor, or working surface.

(2) Safety stop bar. A safety trip rod, cable or wire center cord shall be provided across the front and back of all rope washers extending the length of the face of the washer. It shall operate readily whether pushed or pulled. This safety trip shall be not more than 72 inches above the level on which the operator stands and shall be readily accessible.

[Order 74-19, § 296-301-145, filed 5/6/74.]

WAC 296-301-150 Laundry washer tumbler or shaker. (1) Interlocking device. Each drying tumbler, each double cylinder shaker or clothes tumbler, and each washing machine shall be equipped with an interlock device which will prevent the power operation of the inside cylinder when the outer door on the case or shell is open, and which will also prevent the outer door on the case or shell from being opened without shutting off the power. This should not prevent the movement of the inner cylinder by means of a hand operated mechanism or an "inching device."

(2) Means of holding covers or doors in open position. Each enclosed barrel shall also be equipped with adequate means for holding open the doors or covers of the inner and outer cylinders or shells while it is being loaded or unloaded.

[Order 74-19, § 296-301-150, filed 5/6/74.]

WAC 296-301-155 Printing machine (roller type). (1) Nip guards. All nip guards shall comply with the requirements of WAC 296-301-04503(4).

(2) Crown wheel and roller gear nip protection. The engraved roller gears and the large crown wheel shall be provided with a protective disc which will enclose the nips of the in-running gears. Individual discs for each nip will be deemed to be in compliance with the provisions of WAC 296-301-04503(4).

[Order 74-19, § 296-301-155, filed 5/6/74.]

WAC 296-301-160 Calenders. The nip at the in-running side of the rolls shall be provided with a guard extending across the entire length of the nip and arranged to prevent the fingers of the workers from being pulled in

between the rolls or between the guard and the rolls, and constructed so that the cloth can be fed into the rolls safely.

[Order 74-19, § 296-301-160, filed 5/6/74.]

WAC 296-301-165 Rotary staple cutters. A guard shall be installed completely enclosing the cutters to prevent the hands of the operator from reaching the cutting zone.

[Order 74-19, § 296-301-165, filed 5/6/74.]

WAC 296-301-170 Clothing folding machine. The crank arm and blade guide rods on both sides of the cloth-folding machines shall be protected from contact by barrier guards constructed to conform to the requirements of WAC 296-24-195 through 296-24-19513, of the general safety and health standards.

[Order 74-19, § 296-301-170, filed 5/6/74.]

WAC 296-301-175 Hand bailing machine. An angle-iron-handle stop guard shall be installed at the right angle to the frame of the machine. The stop guard shall be so designed and so located that it will prevent the handle from traveling beyond the vertical position should the handle slip from the operator's hand when the pawl has been released from the teeth of the takeup gear.

[Order 74-19, § 296-301-175, filed 5/6/74.]

WAC 296-301-180 Roll bench. Cleats shall be installed on the ends of roll benches.

[Order 74-19, § 296-301-180, filed 5/6/74.]

WAC 296-301-185 Cuttle or swing folder (overhead type). The bottom of the overhead folders shall be located not less than 7 feet from the floor or working surface.

[Order 74-19, § 296-301-185, filed 5/6/74.]

WAC 296-301-190 Color-mixing room. Floors in color-mixing rooms shall be constructed to drain easily.

[Order 74-19, § 296-301-190, filed 5/6/74.]

WAC 296-301-195 Open tanks and vats for mixing and storage of hot or corrosive liquids. (1) Protection against falls. Open tanks and vats containing hot or corrosive liquids shall be provided with guardrails to conform to the requirements of WAC 296-24-750 through 296-24-75011, of the general safety and health standards.

(2) Shutoff valves. Boiling tanks, caustic tanks, and hot liquid containers, so located that the operator cannot see the contents from the floor or working area, shall have emergency shutoff valves controlled from a point not subject to danger of splash. Valves shall conform to the ASME Pressure Vessel Code, section VIII, Unfired Pressure Vessels, 1968.

[Order 74-19, § 296-301-195, filed 5/6/74.]

WAC 296-301-200 Dye kettles and vats. Pipes or drains of sufficient capacity to carry the contents safely away from the working area shall be installed where there are dye kettles and vats which may at any time contain hot or

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corrosive liquids. These shall not empty directly onto the floor.

[Order 74-19, § 296-301-200, filed 5/6/74.]

WAC 296-301-205 Acid carboys. Carboys shall be provided with inclinators, or the acid shall be withdrawn from the carboys by means of pumping without pressure in the carboy, or by means of hand operated siphons.

[Order 74-19, § 296-301-205, filed 5/6/74.]

WAC 296-301-210 Handling caustic soda and caustic potash. Means shall be provided for handling and emptying caustic soda and caustic potash containers to prevent workers from coming in contact with the caustic (see WAC 296-301-220).

[Order 74-19, § 296-301-210, filed 5/6/74.]

WAC 296-301-215 First aid. The provisions of WAC 296-24-015 through 296-24-070, of the general safety and health standards, shall apply to the textile industry.

[Order 74-19, § 296-301-215, filed 5/6/74.]

WAC 296-301-220 Personal protective equipment.

(1) Personal protective equipment. Workers engaged in handling acids or caustics in bulk, repairing pipe lines containing acids or caustics, etc., shall be provided with protective occupational (safety) equipment to conform to the requirements of WAC 296-24-07501, 296-24-07801, and 296-24-081 through 296-24-08113, of the general safety and health standards.

(2) Respirators, gas masks, and such appliances, for emergency use only, shall be of a type required by WAC 296-24-081 through 296-24-08113, of the general safety and health standards.

[Order 74-19, § 296-301-220, filed 5/6/74.]

WAC 296-301-225 Workroom ventilation. In all workrooms in which potentially toxic substances are used, the maximum allowable concentrations listed in WAC 296-62-075 through 296-62-07515, of the general occupational health standards, shall be maintained. Open surface tanks shall conform to the requirements of WAC 296-62-11021.

[Order 74-19, § 296-301-225, filed 5/6/74.]

Chapter 296-302 WAC

SAFETY STANDARDS FOR BAKERY EQUIPMENT

WAC

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WAC 296-302-010 Bakery equipment—General requirements. (1) Application. The requirements of this chapter shall apply to the design, installation, operation and maintenance of machinery and equipment used within a bakery.

(2) These standards shall be augmented by the Washington state general safety and health standards, and any other regulations of general application which are or will be made applicable to all industries.

(3) The provisions of this chapter shall prevail in the event of a conflict with, or duplication of, provisions contained in chapters 296-24 and 296-62 WAC.

(4) WAC 296-24-006 through 296-24-012 of the general safety and health standards, chapter 296-24 WAC, shall apply where applicable to this industry.

[Order 74-17, § 296-302-010, filed 5/6/74.]

WAC 296-302-015 Definitions. (1) "Dumpbin and blender" applies to those elements of a flour handling system in which flour in bags is first emptied for distribution.

(2) "Flour elevator" means the conveyor which is used to convey flour in a vertical direction and it includes bucket, spiral screw, or bulkflow conveyors.

(3) "Screw conveyor" means the conveyor which is used to convey flour in a horizontal or inclined plane by means of a continuous spiral screw enclosed in a suitable casing which follows the same general contour of the perimeter of the screw.

(4) "Bolting reel" means a device in which the flour is screened through a rotating drum.

(5) "Sifter" means a device in which flour is sifted. It may be of the brush, oscillating, or vibrating type.

(6) "Flour scale" means a scale for weighing flour.

(7) "Flour gate" means the device or devices used to control the delivery of flour.

(8) "Direct fired ovens" are ovens which burn fuel directly inside the baking chamber.

(9) "Direct recirculating ovens" are ovens which have heating systems consisting of one or more heaters (located inside or outside the baking chamber), each heater being equipped with a burner, the products of combustion of which are mixed with spent gases returned from the oven. Combustion gases are circulated through the heater and oven chamber by a fan. An overflow or vent removes part of the spent combustion gases to compensate for fresh combustion gases added by the burner.

(10) "Flue-type ovens" are ovens which burn fuel in a furnace which is connected through flues which carry the combustion gases to stack.

(11) "Indirect multiple-burner ovens" are ovens which are heated by burners (usually gas) which are totally enclosed in such a way that unburned gases or products of combustion cannot enter the baking chamber.

(12) "Steam-tube ovens" are ovens which are heated by a group of tubes which are partially filled with liquid and sealed at both ends. A small part of each tube is exposed to the heat of a furnace and the larger part placed inside the baking chamber. Heat is transmitted by evaporating liquid in the furnace end of the tube. Steam thus formed travels to the other end of the tube, where the steam condenses and returns to the furnace by gravity.

(13) "Indirect recirculating ovens" are ovens which are equipped with a gas tight duct system, a furnace, and a circulating fan. Gases of combustion are circulated through this enclosed system and mixed with fresh combustion gases generated by the burner in the combustion chamber. A vent or overflow removes a portion of the gases to compensate for the fresh gases added by the burner. No unburned gases or products of combustion have access to the baking chamber.

(14) "Electric ovens" are ovens which are heated entirely by passing an electric current through resistance elements.

(15) "NFPA" means National Fire Protection Association.

[Order 74-17, § 296-302-015, filed 5/6/74.]

WAC 296-302-020 General machine guarding. (1) Electrical grounding. The frame of each machine which is driven by an electric motor or has any electrical connection shall be effectively grounded.

(2) Gears. Refer to WAC 296-24-150, machinery and machine guarding of the general safety and health standards, chapter 296-24 WAC.

(3) Removable covers or guards. Any covers or guards which must be removed for cleaning and adjustment shall be made easily removable in order that they may be removed and replaced with the least effort.

(4) Ventilation through machine guards. Where it is necessary to guard motors or other equipment which require ventilation, guards should be so designed that they will not restrict the circulation of the air.

[Order 74-17, § 296-302-020, filed 5/6/74.]

WAC 296-302-025 Flour-handling equipment—Scope and application. All sections of this chapter which include WAC 296-302-025 in the section number, apply to flour-handling equipment.

[Order 74-17, § 296-302-025, filed 5/6/74.]

WAC 296-302-02501 General requirements for flour-handling. (1) Wherever any of the various pieces of apparatus comprising a flour-handling system are run in electrical unity with one another the following safeguards shall apply:

(a) Each apparatus shall be safeguarded by a disconnecting means for the motor circuits as required by National Electrical Code - 1971 edition.

(b) Wherever a flour-handling system is of such size that the beginning of its operation is far remote from its final delivery end, all electric motors operating each apparatus comprising this system shall be controlled at each of two points, one located at each remote end, either of which will stop all motors.

(c) Motor control switches shall be capable of being locked in the open position.

(d) Control circuits for magnetic controllers shall be so arranged that the opening of any one of several limit switches, which may be on an individual unit, will serve to de-energize all of the motors of that unit.

(2) Removable covers on all flour-handling equipment shall be so designed that the lifting effort shall not be more than 50 pounds.

(3) Wherever flour-handling systems are of large construction, suitable walkways or platforms or both shall be constructed around and over bins and apparatus, in accordance with the applicable requirements of the general safety and health standards, chapter 296-24 WAC.

(a) All walkway surfaces shall be maintained in nonslip condition.

(b) Elevated walkways shall have railings and toeboards in compliance with applicable requirements of the general safety and health standards, chapter 296-24 WAC.

(c) All ladders leading to upper walkways shall be in accordance with the applicable requirements of the general safety and health standards, chapter 296-24 WAC.

(d) Wherever walkways are near the ceiling construction of the building, where obstruction to head room is lower than normal standing height, methods shall be provided to warn any occupant of the walkway. This should be done by means of "tell tales" or other suitable means located ahead of the obstruction. Suitable signs shall also be placed on walkways warning occupants of possible danger.

(4) All oscillating and vibrating sifters shall be protected with guard rails in compliance with applicable requirements of the general safety and health standards, chapter 296-24 WAC.

(5) All mechanical transmission shafting, gearing, and sprocket drives shall be completely guarded, preferably with dust-tight housing. Lubrication fittings shall extend to the outside of the guard.

(6) All guards shall be readily removable.

(7) All flour-handling equipment, each individual unit or the entire system collectively, shall be so constructed that all interior or exterior protruding corners are of a rounded nature.

(8) When Class II hazardous conditions prevail, electric motors, motor controllers, and switches shall be of the type approved for such locations in accordance with the requirements of the National Electrical Code - 1971 edition.

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[Order 74-17, § 296-302-02501, filed 5/6/74.]

WAC 296-302-02503 Bag chutes and bag lifts (bag-arm elevators). (1) Bag chutes (gravity chutes for handling flour bags) shall be so designed so as to keep to a minimum the speed of flour bags. If the chute inclines more than 30° from the horizontal, there shall be an upturn at the lower end of the chute to slow down the bags.

(2) Bag-arm elevators with manual takeoff shall be designed to operate at a capacity not exceeding seven bags per minute. The arms on the conveyor chain shall be so spaced as to obtain the full capacity of the elevator with the lowest possible chain speed. There shall be an electric limit switch at the unloading end of the bag-arm elevator so installed as to automatically stop the conveyor chain if any bag fails to clear the conveyor arms.

(3) The conveyor chain on bag-arm elevators shall travel in a suitable structure and all drums shall be completely guarded, so that in case of a broken chain link the remainder of the chain will remain within its guides.

(4) Manlifts shall not be used in bakeries. Bag or barrel lifts shall not be used as manlifts.

[Order 74-17, § 296-302-02503, filed 5/6/74.]

WAC 296-302-02505 Dumpbin and blender. (1) The dumpbin or blender shall be constructed of metal or other nonsplintering material.

(2) Openings shall be protected by means of bars or grids. If grids are made of mesh, the openings shall be not more than 3 inches in either length or width. If parallel bars or rods are used, they shall be spaced not more than 3 inches apart on centers.

(3) Hinged dumpbin covers shall be provided with locks or latches to hold the covers in the open position, so that they will not accidentally fall down while the dumpbin is in operation.

(4) Dumpbins and blenders shall be so constructed that no separate pits in floors shall be required at the point which connects the final discharge to the usual elevator.

(5) All dumpbin and blender hoods shall be of sufficient capacity to prevent circulation of flour dust outside the hoods.

(6) All dumpbins shall be of such a height from the floor as to enable the operator to dump flour from bags, without causing undue strain or fatigue. Where the edge of any bin is more than 24 inches above the floor, a bag rest step shall be provided.

(7) A control device for stopping the dumpbin and blender shall be provided close to the operator's work station.

(8) A screen shall be provided in the suction nozzle over the bin or blender to prevent sacks that are being cleaned from getting into the rotor of the dust collecting fan.

[Order 74-17, § 296-302-02505, filed 5/6/74.]

WAC 296-302-02507 Flour elevators. (1) Flour elevators shall be constructed of metal or other nonsplintering material.

(2) All removable sections of the elevator casing shall be equipped with stationary clamps for quick removal, or shall be equipped with equivalent locking devices which

contain no loose parts which may become detached from either the casing or the cover.

[Order 74-17, § 296-302-02507, filed 5/6/74.]

WAC 296-302-02509 Bolting reels. (1) Bolting reels shall be constructed of metal or other nonsplintering material, with the exception of the bolting cloth.

(2) Refuse tailing spouts shall be readily accessible and shall be located at a safe distance from moving parts.

[Order 74-17, § 296-302-02509, filed 5/6/74.]

WAC 296-302-02511 Storage bins. (1) Storage bins shall be constructed of metal or other nonsplintering material.

(2) Storage bins shall be provided with gaskets and locks or latches to keep the cover closed, or other equivalent devices in order to ensure the dust tightness of the cover. Covers at openings where an employee may enter the bin shall also be provided with a hasp and a lock, so located that the employee shall lock the cover in the open position whenever it is necessary to enter the bin.

(3) Storage bins where the side is more than 5 feet in depth shall be provided with standard stationary safety ladders, both inside and outside, to reach from floor level to top of bin and from top of bin to inside bottom, keeping the ladder end away from the moving screw conveyor.

(4) Loading distribution conveyors shall be located in top of bin centrally unhoused, and all covers for entrance to the bins shall be located away from the loading distribution conveyor.

(5) An electric limit switch or other suitable protective device shall be provided in the top of the bin centrally over the loading screw conveyor on the opposite end of the flour entrance opening. It shall be so designed as to stop the loading screw if an excessive amount of flour is delivered to the bin.

(6) The main entrance cover of large storage bins located at the interior exit ladder shall be provided with an electric interlock for motors operating both feed and unloading screw, so that these motors cannot operate while the cover is open.

[Order 74-17, § 296-302-02511, filed 5/6/74.]

WAC 296-302-02513 Screw conveyors. (1) Screw conveyors shall be constructed of metal or other nonsplintering material.

(2) Each dead-end screw conveyor shall be provided with an overflow safety gate which will operate an electric limit switch to shut down the conveyor before dangerous pressure of material is built up at the dead end.

(3) The covers of all screw conveyors shall be made removable in convenient sections, held on with stationary clamps located at suitable intervals keeping all covers dust-tight. Where drop or hinged bottom sections are provided this provision shall not apply.

[Order 74-17, § 296-302-02513, filed 5/6/74.]

WAC 296-302-02515 Sifters. (1) Enclosures of all types of flour sifters shall be so constructed that they are dust-tight but readily accessible for interior inspection.

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(2) Oscillating and vibrating sifters shall be so constructed that all moving parts are well within the outer frame of the apparatus.

(3) Refuse tailing spouts of all types of sifters shall be readily accessible and shall be located at a safe distance from moving parts.

[Order 74-17, § 296-302-02515, filed 5/6/74.]

WAC 296-302-02517 Flour scales. (1) Flour scales shall be constructed of metal or other nonsplintering material.

(2) Where a transparent covering is provided over dial scales it shall be made of a nonshatterable transparent material.

(3) Traveling or track-type flour scales shall be equipped with bar handles for moving same. The bar should be at least 1 inch in diameter. Trolley track wheels shall be guarded.

(4) All moving trolley wheels located within 8 feet 6 inches of floors or platforms shall be fully guarded on sides and ahead of rotating motion.

(5) The scale cutoff switch shall be totally enclosed and connected to the scale beam in such a manner as to protect the operator from contact.

(6) Where two or more scales are used on traveling flour scales, interlocks shall be provided so that the gate will not open unless the hopper is below.

[Order 74-15, § 296-302-02517, filed 5/6/74.]

WAC 296-302-02519 Automatic flour gates. Automatic flourgate equipment shall be constructed of metal or other nonsplintering material.

[Order 74-17, § 296-302-02519, filed 5/6/74.]

WAC 296-302-03001 Horizontal dough mixers. (1) Mixers with external power application shall have all belts, chains, gears, pulleys, sprockets, clutches, and other moving parts completely enclosed.

(2) Mixers with built-in power units shall have all drive elements enclosed in such a manner as to prevent injury to operators or maintenance personnel performing their normal duties.

(3) Each mixer shall be equipped with an individual motor and control, and with a conveniently located manual switch to prevent the mixer from being started in the usual manner while the machine is being serviced and cleaned.

(4) All electrical control stations shall be so located that the operator must be in full view of the bowl in its open position. Such controls, other than a stop switch, shall not be duplicated.

(5) All mixers with power and manual dumping arrangements shall be equipped with safety devices which shall:

(a) Engage both hands of the operator, when the agitator is in motion under power, and while the bowl is opened more than one-fifth of its total opening.

(b) Prevent the agitator from being started, while the bowl is more than one-fifth open, without engaging both hands of the operator;

(c) Permit the operator to have a full view of the bowl opening while he is in the act of maintaining operation of

the agitator at any time while the bowl is more than one-fifth open.

(6) Mixers with power dumping devices shall be arranged so that the bowl opening cannot be closed beyond four-fifths of its total opening unless the operator maintains the control contact which causes the dump motor to complete the bowl closure. Alternatively the control may be so arranged that the operator must keep at least one hand engaged, by holding in a push button, during the entire closure of the mixing bowl.

(7) Mixers shall be provided with flour-gate operating mechanisms, ingredient openings, and water inlets, which can be conveniently manipulated by the operator from the normal area of activity (either platform or floor) without requiring abnormal reaching, or improvisations which might jeopardize his safety.

(8) Every mixer shall be equipped with a full enclosure over the bowl which is closed at all times while the agitator is in motion. Only minor openings in this enclosure, such as ingredient doors, flour inlets, etc., each representing less than 1 1/2 square feet in area, shall be capable of being opened while the mixer is in operation.

(9) No loose access doors and covers weighing more than 2 pounds shall be used on mixers. Such parts shall be hinged or otherwise held in proximity to the openings that they cover.

(10) Overhead covers or doors which are subject to accidental closure shall be counterbalanced to remain in an open position or provided with means to hold them open until positively released by the operator.

(11) Provision shall be made to bolt mixers solidly to the floor to prevent dislocation or excessive vibration. Open space between mixers and platforms which may endanger the operator shall be guarded.

(12) Mixers shall be installed only on substantial foundations which are capable of safely withstanding the live loads incurred in full-capacity mixing operations.

(13) Access for lubrication at all points shall be provided so as to avoid contact between the lubricating device or the operator's hands and any moving parts.

(14) Any device or mechanism used to return "sponges" to a mixer shall be so interlocked with the mixer as to prevent injury to the operator.

(15) No electrical pilot or control circuits shall be employed at a potential in excess of 240 volts.

(16) A motor-running overcurrent protective device shall be provided for each motor. Undervoltage protection shall be provided in all magnetic controllers.

(17) Positive means shall be provided to prevent application of pressure above the design maximum in all mixer cooling jackets.

(18) Valves and controls to regulate the coolant in mixer jackets shall be located so as to permit access by the operator without jeopardizing his safety.

[Order 74-17, § 296-302-03001, filed 5/6/74.]

WAC 296-302-03003 Vertical mixers. (1) Vertical mixers shall comply with WAC 296-302-03001 (1), (2), (3), (9) through (13), (15) through (17).

(2) Positive means shall be provided to prevent injury to the operator during speed-change manipulation.

(3) Bowl locking devices shall be of a positive type which require the attention of the operator for unlocking.

(4) Devices shall be made available for moving bowls weighing more than 80 pounds, with contents, into and out of the mixing position on the machine.

[Order 74-17, § 296-302-03003, filed 5/6/74.]

WAC 296-302-035 Dividers. (1) Pinch and shear points. All pinch points and shear points from reciprocating or rotating parts of the divider shall be enclosed or guarded, to protect the operator's hands and fingers from these hazards.

(2) Front guards. Guards at front of a divider shall be so arranged that the weight of dough can be adjusted without removing the guard.

(3) Rear of divider. The back of the divider shall have a complete cover to enclose all of the moving parts, or each individual part shall be enclosed or guarded to remove the separate hazards. The rear cover shall be provided with a limit switch in order that the machine cannot operate when this cover is open. The guard on the back shall be hinged so that it cannot be completely removed and if a catch or brace is provided for holding the cover open, it shall be designed so that it will not release due to vibrations or minor bumping whereby the cover may drop on an employee.

(4) Oil holes in knife. The oil holes in the knife at the back of the divider shall be of a maximum width opening of 1/4 inch so an employee's finger cannot go through the hole.

(5) Knife actuating arm. There shall be a saddle guard or other protective device on any elongated hole in the knife actuating arm at the back of the divider.

(6) Shear pins. Dividers shall be equipped with mechanical overload release devices such as shear pins.

[Order 74-17, § 296-302-035, filed 5/6/74.]

WAC 296-302-040 Moulders. (1) Hoppers. Mechanical feed moulders shall be provided with hoppers so designed and connected to the proofer that an employee's hands cannot get into the hopper where they will come in contact with the in-running rolls.

(2) Hand-fed moulders. Hand-fed moulders shall be provided with a belt-feed device or the hopper shall be extended high enough so that the hands of the operator cannot get into the feed rolls. The top edge of such a hopper shall be well rounded to prevent injury when it is struck or bumped by the employee's hand.

(3) Stopping devices. There shall be a stopping device within easy reach of the operator who feeds the moulder and another stopping device within the reach of the employee taking the dough away from the moulder.

(4) Cleanout holes. Machines shall be so designed or guarded that there is no shear point in close proximity to the cleanout holes.

(5) Rear of moulders. At the rear of moulders all revolving shafts shall have round corners or cylindrical surfaces, and all bolts shall be flush. Tie rods shall be far enough from revolving parts to prevent a shearing or pinching hazard.

(6) Adjustment crank. Where a removable crank is used to adjust the moulder for different sizes of loaf, brackets

shall be provided on the side of the machine for holding the crank when it is not in use.

[Order 74-17, § 296-302-040, filed 5/6/74.]

WAC 296-302-045 Manually fed dough brakes. (1) Top-roll protection. The top roll shall be protected by a heavy gage metal shield extending over the roll to go within 6 inches of the hopper bottom board. The shield may be perforated to permit observation of the dough entering the rolls.

(2) Emergency stop bar. An emergency stop bar shall be provided, so located that the body will press against it if the operator should fall forward, and this pressure shall positively open a circuit which will deenergize the drive motor in case of an emergency. In addition a magnetic, spring-set brake shall be deenergized at the same time, causing the rolls to stop instantly. The emergency stop bar shall be activated prior to each shift to check if it is functioning properly.

[Order 74-17, § 296-302-045, filed 5/6/74.]

WAC 296-302-050 Miscellaneous equipment. (1) Proof boxes. All door locks shall be operable both from within and outside the box. Guide rails shall be installed to center the rack as it enters, passes through, and leaves the proof box.

(2) Fermentation room. Fermentation room doors shall have nonshatterable wire glass or plastic panels for vision through doors.

(3) Troughs. Troughs shall be mounted on antifriction bearing casters thus making it possible for the operator to move and direct the motion of the trough with a minimum of effort.

(4) Hand trucks.

(a) Casters shall be set back from corners to be out of the way of toes and heels, but not far enough back to cause the truck to be unstable.

(b) A lock or other device shall be provided to hold the handle in vertical position when the truck is not in use.

(5) Lift trucks. A lock or other device shall be provided to hold the handle in vertical position when the truck is not in use.

(6) Racks.

(a) Sharp splintered or rough corners and edges shall be eliminated.

(b) Racks shall be equipped with handles so located with reference to the frame of the rack that no part of the operator's hands extends beyond the outer edge of the frame when holding onto the handles.

(c) Antifriction bearing casters shall be used to give the operator better control of the rack.

(d) End guards shall be used at shelf levels on proofing racks.

(7) Conveyors.

(a) Wherever a conveyor passes over a main aisleway, regularly occupied work area, or passageway, the underside of the conveyor shall be completely enclosed to prevent broken chains or other material from falling in the passageway or work area.

(b) Stop bumpers shall be installed on all delivery ends of conveyors, wherever manual removal of the product carried is practiced.

(c) All conveyors shall have stop buttons at all operating stations. In addition, emergency stop bars or switches shall be installed at any machine infeed location fed by the conveyor where pinch points exist.

(8) Overhead rail systems.

(a) Handles for operating devices for trolley switches which hang less than 6 feet 8 inches from the floor shall be of pliable material.

(b) Floor scales. Nonshatterable transparent material shall be used to cover dials.

(9) Dough chutes. The entrance to the chute shall be guarded so as to protect the employee from falling into chute, stepping into chute, or tripping over too low an edge of the chute.

(10) Skids.

(a) All sharp corners or edges shall be eliminated on all metal skids.

(b) All edges and corners shall be protected on skids to prevent exposed splinters.

(11) Ingredient premixers, emulsifiers, etc.

(a) All top openings shall be provided with covers attached to the machines. These covers should be so arranged and interlocked that power will be shutoff whenever the cover is opened to a point where the operator's fingers might come in contact with the beaters.

(b) Portable electrical agitators for ingredient premixers shall have the attachment cord so wired that the agitator will be grounded whenever it is connected to a source of power.

(12) Chain tackle.

(a) All chain tackle shall be marked prominently, permanently, and legibly with maximum load capacity.

(b) All chain tackle shall be marked permanently, and legibly with minimum support specification.

(c) Safety hooks shall be used.

(13) Trough hoists, etc.

(a) All hoists shall be marked prominently, permanently, and legibly with maximum load capacity.

(b) All hoists shall be marked permanently and legibly with minimum support specifications.

(c) Safety catches shall be provided for the chain so that the chain will hold the load in any position.

(d) Safety hooks shall be used.

(14) Air-conditioning units.

(a) All sharp corners and edges shall be eliminated.

(b) On large units with doors to chambers large enough to be entered, all door locks shall be operable from both inside and outside.

(15) Pan washing tanks.

(a) Counter-balanced hinged covers, or sliding covers, shall be provided.

(b) The surface of the floor of the working platform shall be maintained in nonslip condition.

(c) Working platforms shall be kept at least 32 inches below the top of the tank or guardrail.

(d) All electrical sockets in pan washing rooms shall be nonmetallic and keyless and other electrical equipment shall be moisture proof.

(e) Power ventilated exhaust hoods shall be provided over the tanks.

(16) Pan washing machines. Sharp corners and edges shall be eliminated.

(17) Cake depositors. All pinch points shall be eliminated, guarded, or shielded so that hands and arms cannot reach these pinch points while the machine is in operation.

(18) Icing machines. All pinch points shall be eliminated, or provided with guards or shields so hands and arms cannot reach these pinch points while the machine is in operation.

(19) Bread coolers, conveyor type.

(a) All pinch points shall be eliminated or guarded.

(b) Stop bumpers on all delivery ends of conveyors shall be installed wherever manual removal of the product carried is practiced.

(20) Bread coolers, rack type.

(a) Guardrails shall be installed to the center rack as it enters and leaves the cooler.

(b) All door locks shall be operable from both within and outside the cooler.

(21) Bread and cake boxes, trays, etc.

(a) Sharp corners and edges shall be eliminated on metal parts.

(b) All wooden corners and edges shall be protected to prevent splinters.

(22) Doughnut machines. Separate flues shall be provided, (a) for venting vapors from the frying section, and (b) for venting products of combustion from the combustion chamber used to heat the fat.

(23) Open fat kettles.

(a) The floor around kettles shall be maintained in nonslip condition.

(b) Fire extinguishing devices suitable for Class-B fires shall be provided. See general safety and health standards, WAC 296-24-590.

(c) Goggles or face shields shall be provided to prevent injuries from hot fat splashes.

(d) The top of the kettle shall be not less than 36 inches above floor or working level.

(24) Steam kettles.

(a) Positive locking devices shall be provided to hold kettles in the desired position.

(b) Kettles with steam jackets shall be provided with safety valves in accordance with the ASME Pressure Vessel Code, section VIII, Unfired Pressure Vessels, 1968.

[Order 74-17, § 296-302-050, filed 5/6/74.]

WAC 296-302-05501 Slicers. (1) Sprockets, chains, and V-belt drives on slicers shall be completely enclosed.

(2) All slicing machines shall be provided with a mechanical device to push the last loaf through the slicer knives.

(3) The cover over the knife head of reciprocating-blade slicers shall be provided with an interlocking arrangement so that the machine cannot operate unless the cover is in place.

(4) On slicers with endless band knives, each motor shall be equipped with a magnet brake which operates whenever the motor is not energized. Each door, panel, or other point of access to the cutting blades shall be arranged by means of mechanical or electric interlocks so that the motor will be de-energized if all such access doors, panels, or access points are not closed.

(5) When it is necessary to sharpen slicer blades on the machine, a barrier shall be provided leaving only sufficient opening for the sharpening stone to reach the knife blades.

(6) Where pusher fingers attached to the feed chain enter the bed plate of the cross feed, the end guard shall be extended to cover the pinch point.

(7) Slicer wrapper conditions:

(a) Where the flight chain on the slicer turns under the bed plate on the crossfeed to the wrapper, a spring-hinged section of bed plate shall be provided so that there is no shear point between the flight chain and the bed plate.

(b) Wrapping and slicing machines obtained from separate manufacturers, shall be installed and connected so that the chains, sprockets, belts, and moving parts are guarded. Interconnections for the starting and stopping of such devices shall be employed.

(c) Mechanical control levers for starting and stopping both slicing machine conveyors and wrapping machines shall be extended or so located that an operator in one location can control both machines. Such levers should be provided wherever necessary, but these should be so arranged that there is only one station capable of starting the wrapping machine and conveyor assembly, and this starting station should be so arranged or guarded as to prevent accidental starting. The electric control station for starting and stopping the electric motor driving the wrapping machine and conveyor should be located near the clutch starting lever.

(d) The transfer chain shall be completely covered on all sides, not just on front and top.

[Order 74-17, § 296-302-05501, filed 5/6/74.]

WAC 296-302-05503 Wrappers. (1) Any hand wheel which may be provided in order to turn the wrapping machine over by hand and which may run continuously shall be a smooth, solid disk wheel.

(2) At the discharge end (or drive side) of the crossfeed conveyor there shall be either a one- or two-piece guard in front of the crossfeed chain.

(3) Electrical heaters on wrappers shall be protected by a cover plate properly separated or insulated from the heaters in order that accidental contact with this cover plate will not cause a burn to the operator.

(4) Electric wiring for the wrapper heaters shall be so arranged that a minimum number of wires are used to connect the movable heaters assembly to the permanent wiring of the machine. This wiring shall be heat-resisting type in accordance with the requirements of the National Electrical Code - 1971 Edition.

(5) Power-driven friction rollers used to feed paper into the wrapping machine shall be provided with a guard over the in-running nip point of the rubber rollers.

(6) The nip point, between the chain and sprocket of the loose wrap attachment, shall be completely enclosed or guarded on both sides in such a way that employee's fingers cannot get into this nip point.

(7) Sprocket, chain, and V-belt drives on wrappers shall be completely enclosed.

[Order 74-17, § 296-302-05503, filed 5/6/74.]

WAC 296-302-060 Biscuit and cracker equipment.

(1) Meal, peanut, and fig grinders.

(a) If the hopper is removable it shall be provided with an electric interlock so that the machine cannot be put in operation when the hopper is removed.

(b) Where grid guards cannot be used, feed conveyors to hoppers, or baffle-type hoppers, shall be provided. Hoppers in such cases shall be enclosed and provided with hinged covers, and equipped with electric interlock to prevent operation of the machine with the cover open.

(2) Sugar and spice pulverizers.

(a) All drive belts used in connection with sugar and spice pulverizers shall be grounded by means of metal combs or other effective means of removing static electricity. All pulverizing of sugar or spice grinding shall be done in accordance with NFPA 62-1967 (Standard for Dust Hazards of Sugar and Cocoa), NFPA 656-1959 (Standard for Dust Hazards in Spice Grinding Plants).

(b) Magnetic separators shall be provided to reduce fire and explosion hazards.

(3) Cheese, fruit, and food cutters. These machines shall be protected in accordance with the requirements of (1) of this section.

(4) Jam, icing, and marshmallow beaters of horizontal tub type. All top openings shall be provided with covers attached to the machines.

(5) Reversible dough brakes. Reversible brakes shall be provided with a guard or tripping mechanism on each side of the rolls. These guards shall be so arranged as to stop the machine or reverse the direction of the rolls so that they are outrunning if the guard is moved by contact of the operator.

(6) Cross-roll brakes. Cross-roll brakes shall be provided with guards that are similar in number and equal in effectiveness to guards on hand-fed brakes.

(7) Box- and roll-type dough sheeters.

(a) Sheetting rolls shall be guarded at the point where the dough enters the rolls so that the operator's fingers cannot get into the nip point.

(b) Hoppers for sheeters shall have an automatic stop bar or automatic stopping device along the back edge of the hopper. If construction does not permit location at the back edge, the automatic stop bar or automatic stopping device shall be located where it will be most effective to accomplish the desired protection.

(8) Cutting and panning, embossing, peeling, bar, and fruitana machines.

(a) Roll stands, other than hand fed, shall be guarded at the point where the dough enters the rolls so that the operator's fingers cannot get into the nip points.

(b) Guards shall be provided at each side of the cutter to prevent hands from getting under the cutter.

(c) Reciprocating panner heads shall be guarded to protect the operator from being caught between moving and stationary parts.

(d) Motor control buttons shall be located within view of the cutting head.

(9) Rotary, die machines, pretzel rolling, and pretzel-stick extruding machines. Dough hoppers shall have the entire opening protected with grid-type guards to prevent the employee from getting his hands caught in moving parts, or the hopper shall be extended high enough so that the operator's hands cannot get into moving parts.

(10) Band ovens. Band ovens shall be so arranged, or guarded, that the operator cannot get caught at the nip point

between the band and the drive pulley or the takeup pulley, or between the oven conveyor and the oven frame.

(11) Wafer-cutting machines. These machines shall be so guarded that it will be impossible for employee's fingers or hands to come in contact with the saws or knives while feeding the machine.

(12) Pan cooling towers.

(a) Where pan cooling towers extend to two or more floors, a lockout switch shall be provided on each floor in order that

mechanics working on the tower may positively lock the mechanism against starting. Only one start switch shall be used in the motor control circuit.

(b) All unused sides of pan cooling tower conveyors shall be enclosed or effectively guarded to a height of 7 feet above each floor.

(c) Wherever a pan cooling tower conveyor passes through a floor, the opening shall be protected by a standard railing and toeboard as defined by the general safety and health standards, chapter 296-24 WAC, or by other equivalent protection.

(d) Wherever a pan conveyor passes over a main aisleway, regularly occupied work area, or passageway, the underside of the conveyor shall be completely enclosed to prevent pans, broken chains, or other material from falling in the aisleway, work area or passageway.

(e) Sprocket wheels of pan conveyors shall be enclosed so that accidental contact cannot be made at the point where the chain comes in contact with the sprocket.

(f) Wherever conveyor bars, flights, and attachments pass in opposite directions within 6 inches of each other, a sheet metal partition or screen with openings no larger than one-half inch shall be placed between the conveyor chains which run in opposite directions.

(13) Chocolate melting, refining, and mixing kettles. Each kettle shall be provided with a cover to enclose the top of the kettle. The bottom outlet of each kettle shall be of such size and shape that the operator cannot reach in to touch the revolving paddle or come in contact with the shear point between the paddle and the side of the kettle.

(14) Caddie, cover, and box stitchers (wire stitchers). A guard shall be mounted on the stitching head to prevent operators from getting fingers caught between the stitching head and the clincher block.

(15) Carton-wrapping and bundling machines. The end seal drums on carton and bundling machines shall be provided with guards.

(16) Carton and lining feeding machines. Cutting knives shall be provided with a hinged hood to cover the knives. These guards shall be electrically interlocked to stop the machine if they are removed.

(17) Peanut cooling trucks. Mechanically operated peanut cooling trucks shall have a grid-type cover over the entire top.

[Order 74-17, § 296-302-060, filed 5/6/74.]

WAC 296-302-065 Ovens—Scope and application. All sections of this chapter which include WAC 296-302-065 in the section number, apply to ovens.

[Order 74-17, § 296-302-065, filed 5/6/74.]

WAC 296-302-06501 General location. (1) Ovens shall be located with due regard to the possibility of fire resulting from overheating or from the escape of gas or fuel oil and the possibility of injury to persons resulting from explosions.

(2) Ovens shall be built on noncombustible foundations; excepting that where unusual circumstances require that an oven be placed on a combustible floor, the sole of the oven itself shall be insulated and shall be separated from the floor by a ventilated air space of at least 3 inches. In no case shall the temperature of a combustible floor beneath an oven be permitted to exceed 160°F.

(3) Insulation shall be used in the crown of any oven, and the space above this crown shall be ventilated, to prevent the temperature of any combustible ceilings from rising above 200°F.

(4) Where oven ducts or stacks pass through combustible walls or ceilings, sufficient clearance and insulation shall be provided to keep the temperature of combustible material below 160°F.

(5) Columns or structural members of a building shall not pass through an oven. When such columns or structural members are closer than 6 inches to the inner shell of an oven, fireproof material shall be used and insulated in such a way that the temperature of the column or structural member will be kept below 160°F.

(6) Ovens shall be located so as to be accessible from all sides and adequately spaced to permit the proper functioning of explosion vents.

(7) Ovens shall be located so that possible fire or explosion will not expose groups of persons to possible injury. For this reason ovens shall not adjoin lockers, lunch or sales rooms, main passageways, or exits.

[Order 74-17, § 296-302-06501, filed 5/6/74.]

WAC 296-302-06503 General requirements. (1) Protecting devices shall be maintained and kept in working order.

(2) All safety devices on ovens shall be inspected at intervals of not less than twice a month by an especially appointed, properly instructed bakery employee, and not less than once a year by representatives of the oven manufacturers.

(3) Protection of gas pilot lights shall be provided when it is impracticable to protect the main flame of the burner and where the pilot flame cannot contact the flame electrode without being in the path of the main flame of the burner.

(a) Failure of any gas pilot shall automatically shut off the fuel supply to the burner.

(b) Ovens with multiple burners shall be equipped with individual atmospheric pilot lights where there is sufficient secondary air in the baking chamber and where gas is available, or else each burner shall be equipped with an electric spark-type ignition device.

(4) Burners of a capacity exceeding 150,000 b.t.u. per hour equipped with electric ignition shall be protected in addition by quick-acting combustion safeguards.

(a) The high-tension current for any electric spark-type ignition device shall originate in a power supply line which is interlocked with the fuel supply for the oven in such a way that in case of current failure both the source of

electricity to the high-tension circuits and the fuel supply shall be turned off simultaneously.

(b) All electric circuits in connection with ignition systems on ovens shall comply with the National Electrical Code 1971 Edition.

(c) Combustion safeguards used in connection with electric ignition systems on ovens shall be so designed as to prevent an explosive mixture from accumulating inside the oven before ignition has taken place.

(5) When fuel is supplied and used at line pressure, safety shutoff valves shall be provided in the fuel line leading to the burner.

(a) When fuel is supplied in excess of line pressure, safety shutoff valves shall be provided in the fuel line leading to the burners, unless the fuel supply lines are equipped with other automatic valves which will prevent the flow of fuel when the compressing equipment is stopped.

(b) The safety shutoff valve shall be positively tight and shall be tested at least twice monthly.

(c) Packing glands shall be designed so that the valve will not be made inoperative by excessive tightening of the packing gland.

(d) Electrically operated safety shutoff valves shall be normally closed and not depend on electricity for shutting off the fuel supply.

(e) A safety shutoff valve shall require manual operation for reopening after it has closed, or the electric circuit shall be so arranged that it will require a manual operation for reopening the safety shutoff valve.

(f) Manual reset-type safety shutoff valves shall be so arranged that they cannot be locked in an open position by external means.

(g) Where blowers are used for supplying the air for combustion the safety shutoff valve shall be interlocked so that it will close in case of air failure.

(h) Where gas or electric ignition is used, the safety shutoff valve shall close in case of ignition failure. On burners equipped with combustion safeguards, the valve shall close in case of burner flame failure.

(6) One main, manually operated, fuel shutoff valve shall be provided on each oven, and shall be located ahead of all other valves in the system.

(7) All individual gas or oil burners with a heating capacity over 150,000 b.t.u. per hour shall be protected by a safeguard which is actuated by the flame and which will react to flame failure in a time interval not to exceed 2 seconds. All safeguards, once having shut down a gas or oil burner, shall require manual resetting and starting of the burner or burners.

(8) Any space in an oven (except direct fired ovens) which could be filled with an explosive mixture shall be protected by explosion vents. Explosion vents shall be made of minimum weight consistent with insulation.

(a) Explosion doors which have a weight shall be attached by chains or similar means to prevent flying parts from injuring the personnel in case of an explosion.

(b) Where explosion vents are so located that flying parts or gases might endanger the personnel working on or near the oven, internal or external protecting means shall be provided in the form of heavily constructed shields or deflectors made from noncombustible material.

(c) Specifically exempted from the provisions of these standards as contained in (8)(a) and (b) of this section are heating systems on ovens in which the fuel is admitted only to enclosed spaces, which shall have been tested to prove that their construction will resist repeated explosions without deformation.

(9) Flues and dampers.

(a) All ovens (except electrically heated) shall be properly and firmly connected to an active chimney or flue of ample size to carry away the flue gases.

(b) The chimney shall be preinspected after installation or repair to determine whether it is in suitable condition.

(c) The flue pipe or breeching shall be properly supported in all cases.

(d) Means shall be employed which will prevent the flue pipe or breeching from entering beyond the inner wall of the chimney flue.

(e) Flue pipe shall be cemented or otherwise sealed to the chimney wall so as to prevent infiltration of air.

(f) A flue damper or other equivalent means for regulating draft shall be installed on each oven, the proper operation of which depends on natural draft.

(g) Dampers, where used, shall be equipped with accessibly located minimum and maximum stops. The minimum stop for dampers shall be adjusted to obtain sufficient air for combustion at the minimum oven output. Where stack dampers are used in connection with oil- or gas-fired ovens, they shall be equipped with means to turn the burner off when the damper is closed.

(10) Where the initial pressure of the fuel is lower than the air pressure used for combustion, check valves shall be installed in the fuel line to prevent air from backing up into the fuel lines. For instance, in gas burner apparatus, which uses air at pressures exceeding the gas service pressure, a check valve shall be provided in the gas line next to the mixing device.

(11) Where the gas supply pressure is substantially higher than that at which the burners of an oven are designed to operate, a gas pressure regulator shall be employed.

(a) Gas pressure regulators, where used, shall maintain the gas pressure to the manifold within 10 percent of the operating pressure from maximum to minimum consumption rates.

(b) Regulators shall be of the spring-loaded, dead-weight, or pressure-balanced type. Spring- or weight-loaded regulators shall have springs or weights covered by suitable housing. Under no circumstances shall a weight and lever type of regulator be used.

(c) A gas pressure regulator, requiring access to atmosphere for successful operation, shall be vented to the outer air.

(d) A relief valve shall be placed on the outlet side of gas pressure regulators where gas is supplied at high pressure. The discharge from this valve shall be piped to the outside of the building.

(12) All chambers which have to be connected to the atmosphere, but are separated from any gaseous or other volatile fuel by a flexible membrane, as, for instance, a diaphragm, bellows, etc., shall be connected by a pipe of at least one-half inch size to the outside atmosphere. The outside end of this pipe shall be protected against flooding

or accidental plugging by ice formation, insects, or other causes, by providing a "tee" with double elbow connections pointing downwards at the top of the pipe, and screened outlets. Where several of such chambers are used in close proximity, a common vent line may be used.

(13) Where accumulation of dust in the air supply might affect the proper functioning of mixing devices and burners, the air supply inlet shall be equipped with suitable air filters. A standby filter should be available to permit interchanging filters for cleaning purposes.

[Order 74-17, § 296-302-06503, filed 5/6/74.]

WAC 296-302-06505 Construction. (1) Structural parts of ovens shall be protected against corrosion or deterioration.

(2) Roofs and other parts of ovens shall be structurally strong enough to support the weight of persons who may be required to climb on top of ovens or inside of them.

[Order 74-17, § 296-302-06505, filed 5/6/74.]

WAC 296-302-06507 Safeguards of mechanical parts. (1) Emergency stop buttons shall be provided on mechanical ovens near the point where operators are stationed.

(2) All piping at ovens shall be tested to be gastight.

(a) Soldered pipe joints shall not be permitted in connection with ovens. Pipe joints may be either screwed, flanged, or welded, in connection with ovens where such pipes carry fuel or steam.

(b) All pipe and fittings used shall be of such schedule which will safely carry the pressure and be clear and free from cutter burrs and defects in structure or threading.

(3) Main shutoff valves, operable separately from any automatic valve, shall be provided to permit turning off the fuel or steam in case of an emergency.

(a) Main shutoff valves shall be located so that explosions, fires, etc., will not prevent access to these valves.

(b) Main shutoff valves shall be locked in the closed position when persons must enter the oven or when the oven is not in service.

[Order 74-17, § 296-302-06507, filed 5/6/74.]

WAC 296-302-06509 Gas-burning systems. (1) Liquefied petroleum gas shall be stored and distributed in accordance with the requirements of the general safety and health standards, chapter 296-24 WAC.

(b) Inspirators on atmospheric (low-pressure) gas-burning systems shall be so constructed and machined as to ensure correct alignment of the gas jet with the axis of the inspirator. Air adjustments or shutters on inspirators on atmospheric gas-burning systems shall either be permanently fixed or else provided with a locking device to positively prevent accidental change of setting. The shutter shall be so located that adjustments can be made when the oven is in normal operating condition.

(3) Dampers controlling the draft on ovens equipped with atmospheric gas-burning systems shall be interconnected with the gas supply so that no gas can be admitted to the burners if the damper is closed.

(a) Atmospheric pipe burners extending into the baking chamber of ovens fired with atmospheric gas-burning systems shall have secondary air ducts installed below each burner and extending over its full length. Air inlets for these ducts shall be placed outside the baking chamber.

(b) Stack dampers on ovens equipped with atmospheric gas-burning systems shall have a hole of the following diameter:

Diameter of flue	Diameter of opening
3 to 5 _____	1/2
6 to 10 _____	1
11 to 15 _____	1 1/2

Dimensions given in inches.

(4) Nozzle or blast burners on atmospheric gas-burning systems shall be equipped with gas pilots or electric ignition; with the exception that burners operated on a maximum-minimum flame or modulating principle which are equipped with quick acting combustion safeguards actuated by the main burner flame may be equipped with automatic or hand torch ignition to be used for initial lighting only.

(5) Burners of the perforated pipe, ribbon, slot, tip, or similar types, having many individual ports, shall be capable of maintaining a stable flame over the entire length (or surface) of the burner throughout the turndown range and under all draft conditions which may arise in the operation of the oven, unless ignition of gas from every port shall immediately result from the ignition of gas at any single port, when gas is supplied to the burner at the highest and lowest rating of the burners.

(6) Premixed gas burners shall be so designed that the burner will not backfire or blow off within the operating range of the burner.

(a) Multiple port burners, such as ribbon, strip, or tip burners, when used on premixed gas systems, shall be capable of instant ignition of the burner over its entire length when operated within the proper range of the burner, either in a normal or steam-laden oven atmosphere or under any other oven conditions which might extinguish the flame.

(b) Where a number of premixed gas burners are connected to a single premixing device, each burner shall be equipped with electric or gas ignition.

(7) High-pressure inspirators (using gas at pressures exceeding 1 p.s.i.) shall be so constructed and machined as to insure perfect alignment of the gas jet with the axis of the inspirator.

(a) No high-pressure inspirator shall be installed with a valve or other obstruction between the inspirator and the burner.

(b) Each high-pressure inspirator shall have a gas adjustment consisting of a fixed replaceable orifice or an adjustable orifice. When an adjustable orifice is used, the adjusting screw shall be protected by a gas-tight plug.

(c) Air adjustments on high-pressure inspirators shall be provided with positive locking means.

(d) High-pressure inspirators shall be so located that air adjustments can be made during the operation of the oven.

(e) High-pressure inspirators shall be mounted in such a position that should a backfire occur, it cannot injure the operator or ignite any combustible material.

(f) High-pressure inspirators used on gas-burning systems, which are supplied under pressure with a partial

mixture of air and gas instead of straight gas, shall not be used unless the amount of air mixed with the gas is sufficiently low to keep the mixture rich enough to be above the upper explosive limit.

(g) Low-pressure proportioning inspirating sets (using air at pressures from one-half to 1 1/2 p.s.i. and gas at or about atmospheric pressure) shall be equipped with a positive locking device on the adjustment for setting the gas-air ratio.

(8) Low-pressure proportioning inspirators equipped with zero governors, which do not compensate for any change in resistance in the mixture pipe, shall be installed so that there is no valve or other obstruction between the inspirators and the burners. Diaphragm air spaces of governors on low-pressure proportioning inspirating sets shall be vented to the outside of the building.

(9) Two-pipe systems: No valve or other obstruction shall be placed between the mixing valve and the burners on any two-pipe system which uses air and gas under pressure, unless the mixing valve is equipped with a device which automatically will prevent excessive pressure rise in the mixture pressures. Two-pipe systems shall be equipped with means for cleaning the air and gas before they enter the mixing valve.

[Order 74-17, § 296-302-06509, filed 5/6/74.]

WAC 296-302-06511 Gas mixing machines. (1) All burners supplied with complete mixture from the machine shall be equipped with flash and flame arrestors equipped with automatic shutoff valves actuated by heat. These controls shall be installed as close to the burners as practical and also at the outlet of the premixing machine ahead of the individual burner shutoffs to prevent the flame from reaching the mixture supply pipe.

(a) The main mixture lines and the gas machine proper shall be amply protected against fire or explosion hazard by flashback arrestors and relief vents or soffheads located outside the building. Some gas mixing machines are used for partially premixing gas and air and supplying this mixture to high-pressure inspirators where additional air is entrained. If the gas-air ratio is such that the mixture remains so rich as to be above the upper explosive limit over the entire range of the machine, flash arrestors or explosion vents are not required. Positive means shall be provided which will prevent any such gas mixing machine from producing an explosive mixture.

(b) All diaphragm or similar chambers shall be connected to the atmosphere outside of the building.

(c) An automatic safety shutoff valve shall be provided in the gas line leading to the mixing valve which will close the gas supply in case the suction disappears at the compressor inlet or the current to the compressor is shutoff.

(d) Air inlets to gas mixing machines shall be piped to a location outside the building and shall be located at a point protected against dust.

(2) No valve or obstruction shall be installed between mixing blowers and burners.

(a) Mixing blowers shall be so constructed that they will supply a mixture of air and gas that will not blow off or backfire over the entire range of adjustments.

(b) Mixing blowers shall be provided with a pressure regulator in the gas line at the inlet to the mixing valve (to prevent variations in the air-gas ratio).

(c) Housings of mixing blowers shall be constructed to withstand any possible internal explosion.

(d) Mixing blowers shall be provided with an automatic safety shutoff valve in the gas line leading to the blower, which the safety shutoff valve will close in case of failure of either gas pressure or electric current.

[Order 74-17, § 296-302-06511, filed 5/6/74.]

WAC 296-302-06513 Oil-burning equipment. (1) The storage and distribution of fuel oil in bakeries shall be arranged according to reference NFPA 31-1968 Standard for Installation of Oil Burning Equipment.

(2) Oil burners shall be of a type approved by Underwriters' Laboratories, Inc. (See WAC 296-24-006, of the general safety and health standards.)

(a) Each oil burner shall be equipped with an electric ignition or gas pilot.

(b) Oil burners shall be protected against flame failure and overflowing of oil by a quick-acting combustion safeguard operated by the main burner flame. The time interval between flame failure and fuel shutoff shall be short enough to prevent a dangerous accumulation of an explosive mixture or the entry of a dangerous amount of fuel oil into the heating system; with the exception that on ovens requiring 150,000 b.t.u. per hour or less any combustion safeguard listed by the Underwriters Laboratories, Inc., may be used. (See WAC 296-24-006, of the general safety and health standards.)

(c) The shutting off of the fuel supply shall be accomplished by stopping the individual burner pump equipped with a pressure cutoff valve, or by closing a suitable valve.

(d) Oil-fired ovens shall have dampers so arranged that a small amount of air is passed through the furnace at all times.

(e) Oil burners capable of being withdrawn from the furnace (for adjustment, etc.) shall be provided with an interlock which will prevent the burner from starting when in the withdrawn position.

(f) Preheating of oil, where necessary, shall be done by steam, hot water, or electric heater, and shall be thermostatically controlled. Heaters shall be substantially constructed with all joints made oil tight. Thermometers shall be installed at accessible locations to indicate the temperature of the heated oil. Heaters shall be bypassed or provided with means to prevent abnormal pressure.

(g) Oil burners equipped with mechanical means for supplying air shall have an interlock between the air pressure and the oil supply so that the burner cannot operate unless air for proper combustion is available.

(3) High-pressure atomizing oil burners shall be provided with a pressure cutoff valve between the pump and the nozzle.

(4) Air atomizing burners equipped with maximum-minimum or modulating controls, and which are arranged to have the ignition turned off after initial lighting has been accomplished, shall be equipped with a quick-acting flame safeguard directly actuated by the main flame of the burner.

(5) Mechanical atomizing burners of the rotary type shall be operated on the on-off principle and shall be equipped with safeguards actuated by the main flame.

(6) Evaporator-type burners shall be installed in such a way that provision is made to open the draft damper before oil can be admitted to the burners.

(7) Burners supplied by "vapofiers" shall be equipped with a protected gas or electric pilot. In combination vapofier-gas heating systems, the burner shall be protected in accordance with the requirements of WAC 296-302-06509.

[Order 74-17, § 296-302-06513, filed 5/6/74.]

WAC 296-302-06515 Solid-fuel firing equipment.

(1) In solid-fuel firing systems proper draft shall be maintained at the stack as long as there is fuel in the furnace. All breachings and flues shall be kept in a tight and clean condition. Solid-fuel firing systems using forced draft shall have the air supply to the ash pit interconnected with the furnace in such a way that the air pressure is shut off when the furnace door is opened.

(2) Mechanical stokers.

(a) Fuel feed and air supply to mechanical stokers shall be interlocked in such a way that fuel cannot be fed without sufficient air being available.

(b) Dampers in mechanical-stoker fired systems shall be interlocked with the stoker in such a way that the stoker cannot be started unless the damper is open.

[Order 74-17, § 296-302-06515, filed 5/6/74.]

WAC 296-302-06517 Electrical heating equipment.

(1) All electrical equipment shall be built and installed according to the National Electrical Code - 1971 edition.

(2) Open heating elements inside the baking chamber shall be guarded against accidental touching by the product being baked, by the body of the operator, or by current-conducting implements which may be used.

(3) A main disconnect switch or circuit breaker shall be provided. This switch or circuit breaker shall be so located that it can be reached quickly and safely. The main switch or circuit breaker shall have provisions for locking it in the open position if any work on the electrical equipment or inside the oven must be performed.

[Order 74-17, § 296-302-06517, filed 5/6/74.]

WAC 296-302-06519 Direct-fired ovens. (1) Direct-fired ovens shall be safeguarded against failure of fuel, air, or ignition.

(2) To prevent the possible accumulation of explosive gases from being ignited after a shutdown, all direct-fired ovens with a heating capacity over 150,000 b.t.u. per hour shall be ventilated before the ignition system, combustion air blower, and the fuel can be turned on. The prevention shall insure at least four complete changes of atmosphere in the baking chamber by discharging the oven atmosphere to the outside of the building and entraining fresh air into it. The prevention shall be repeated whenever the heating equipment is shut down by a safety device.

[Order 74-17, § 296-302-06519, filed 5/6/74.]

WAC 296-302-06521 Direct recirculating ovens. (1) Each circulating fan in direct recirculating ovens shall be interconnected with the burner in such a manner that the fuel is shut off by a safety valve when the fan is not running.

(2) The flame of the burner or burners in direct recirculating ovens shall be protected by a quick-acting flame-sensitive safeguard which will automatically shut off the fuel supply in case of burner failure.

(3) Direct recirculating ovens shall be equipped with preventilating devices.

(4) Fans in direct recirculating ovens shall be constructed of materials suitable for the temperatures at which they will operate and designed with an ample safety factor to prevent rupture of the wheel.

(5) Fan wheel in direct recirculating oven shall be protected against direct impingement of the flame of the burner or burners.

(6) Direct recirculating ovens, and particularly fans in and on such ovens, shall be protected from overheating by means of a temperature limiting device.

(7) When the burner or burners on direct recirculating ovens are mounted at elevated positions permanent steps shall be provided for safe and convenient access to the burner or burners.

[Order 74-17, § 296-302-06521, filed 5/6/74.]

WAC 296-302-06523 Flue-type ovens. (1) Flue-type ovens shall be operated in such a way that less than atmospheric pressure is maintained in the flues.

(2) Gas burners in flue-type ovens shall be protected against flame failure.

(3) Oil burners on flue-type ovens shall be equipped with combustion safeguards as listed by the Underwriters Laboratories, Inc.

(4) Solid-fuel stoker-fired flue-type ovens shall have the stack damper interlocked with the stoker so that the stoker cannot be operated when the damper is closed.

[Order 74-17, § 296-302-06523, filed 5/6/74.]

WAC 296-302-06525 Indirect-fired multiple burner ovens. (1) Indirect-fired multiple-burner ovens shall be equipped with safety shutoff valves which are interlocked with the ignition system, the air pressure and the gas pressure.

(2) Parts of enclosures reaching through the wall of indirect-fired multiple-burner ovens, and observation windows on such ovens, shall be tested at least once each year with repeated explosions, and afterward inspected for leaks.

[Order 74-17, § 296-302-06525, filed 5/6/74.]

WAC 296-302-06527 Steam-tube ovens. Steam-tube ovens shall be protected against overfiring (firing at an excessive rate) and overheating (heating to excessive temperatures) by devices which control the maximum amount of fuel admitted to the furnace and the maximum permissible temperature in the baking chamber.

[Order 74-17, § 296-302-06527, filed 5/6/74.]

WAC 296-302-06529 Indirect recirculating ovens. (1) Indirect recirculating ovens shall have all oil and gas

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burners equipped with quick-acting flame sensitive combustion safeguards.

(2) Duct systems in indirect-recirculating ovens shall be protected by explosion vents having a minimum total area of 1 square foot of vent to 15 cubic feet of total duct volume. These explosion vents shall be so located that they will not release hot gases or flying parts in the direction of an operator.

(3) Duct systems (in ovens) operating under pressure shall be tested for tightness in the initial starting of the oven and also at intervals not farther apart than 6 months.

(4) Fans and other parts in indirect recirculating ovens shall comply with requirements as listed under WAC 296-302-06521.

[Order 74-17, § 296-302-06529, filed 5/6/74.]

WAC 296-302-06531 Electric ovens. Electric ovens shall be installed, operated, and maintained in accordance with the National Electrical Code - 1971 edition.

[Order 74-17, § 296-302-06531, filed 5/6/74.]

Chapter 296-303 WAC SAFETY STANDARDS FOR LAUNDRY MACHINERY AND OPERATIONS

WAC

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WAC 296-303-010 Laundry machinery and operations—Scope and application. This chapter applies to moving parts of equipment used in laundries and to conditions peculiar to this industry, with special reference to the point of operation of laundry machines. This chapter does not apply to dry-cleaning operations.

[Order 74-18, § 296-303-010, filed 5/6/74.]

WAC 296-303-01001 General industrial safety standards. (1) General. These standards shall be augmented by the Washington state general safety and health standards, and any other regulations of general application which are or will be made applicable to all industries.

(2) Additional requirements. The employer shall comply with the provisions of the standards referenced in this section. In the event of any conflict between this section and WAC 296-303-015 through 296-303-040, the requirements of WAC 296-303-015 through 296-303-040 shall apply. The provisions of this chapter shall prevail in the event of conflict with, or duplication of, provisions contained in chapter 296-24 and 296-62 WAC.

(a) Industrial lighting. American National Standard Practice for Industrial Lighting, ANSI A11.1-1965 (R-1970).

(b) Floor and wall openings, railings, and toeboards. American National Standard Safety Requirements for Floor and Wall Openings, Railings, and Toeboards, ANSI A13.1-1956.

(c) Identification of piping systems. American National Standard Safety Standard for Mechanical Power Transmission Apparatus, ANSI A13.1-1956.

(d) Mechanical power transmission apparatus. American National Standard Safety Standard for Mechanical Power Transmission Apparatus, ANSI B15.1-1971.

(e) Pressure piping—Power piping. American National Standard Code for Pressure Piping—Power Piping, ANSI B31.1.0-1967. Addenda to the American National Standard Code for Pressure Piping—Power Piping, ANSI B31.1.0a-1969.

(f) Sanitation. American National Standard Requirements for Sanitation in Places of Employment, ANSI Z4.1-1968.

(g) Local exhaust systems. American National Standard Fundamentals Governing the Design and Operation of Local Exhaust Systems, ANSI Z9.2-1960.

(h) Gas appliances and gas piping. American National Standard for the Installation of Gas Appliances and Gas Piping, ANSI Z21.30-1964.

(3) WAC 296-24-006 through 296-24-012 of the general safety and health standards, chapter 296-24 WAC, shall apply where applicable to this industry.

[Order 74-18, § 296-303-01001, filed 5/6/74.]

WAC 296-303-01003 Definitions. (1) "Laundry" means an establishment wherein the washing, ironing, or other finishing of clothes, or any other textiles is done, but excluding printing, bleaching, dry cleaning, or dyeing of clothes or other textiles.

(2) "Marking machine" means a power-driven machine used for marking clothes or other textiles.

(3) "Washing machine" means a power-driven machine used for washing clothes or other textiles. It generally consists of a stationary case or shell inside of which is a revolving perforated cylinder.

(4) "Extractor" means a power-driven centrifugal machine used for removing surplus moisture from clothes or other textiles by centrifugal action.

(5) "Wringer" means one or more power-driven rolls used for removing surplus moisture from clothes or other textiles.

(6) "Starch mixer" means a power-driven machine used for mixing or processing starch.

(7) "Starching machine" means a power-driven machine used for the starching of clothes or other textiles.

(8) "Drying tumbler" means a machine within which clothes or other textiles are dried by air, and which usually consists of an enclosure inside of which is a revolving cylinder.

(9) "Shaker" (clothes tumbler) means a revolving cylinder used for shaking out clothes or other textiles.

(10) "Drying room" means an enclosure used for drying clothes or other textiles, and containing any power-driven mechanism.

(11) "Dampening machine" means a machine used for dampening clothes or other textiles.

(12) "Ironer" means a hand- or power-operated machine, with one or more rolls or heated surfaces in contact, used for ironing or smoothing clothes or other textiles.

(13) "Shaping machine" means a power-driven machine used to shape, mold, or otherwise finish clothes or other textiles; this term shall also include shaping tables, stands, or shelves upon which the machine may be mounted.

(14) "Sewing machine" means a machine used for sewing or stitching clothes or other textiles.

(15) "Guarded" means covered, shielded, fenced, enclosed, or otherwise protected by means of suitable covers or casings, barrier rails, safety bars, or screens, to eliminate the possibility of accidental contact with, or dangerous approach by, persons or objects.

(16) "Enclosed" means that the object or equipment or part thereof is so guarded that accidental contact at the point of danger, during the regular operation of the equipment, is not possible.

(17) "Safety interlock" means a device that will prevent the operation of the machine while the cover or door is open or unlocked and will hold the cover or door closed and locked while the basket or cylinder is in motion.

(18) "Moving parts" means gears, sprockets, revolving shafts, clutches, belts, pulleys, or other revolving or reciprocating parts that are attached to, or form an integral part of, a machine.

(19) "Power transmission" pertains to equipment such as shafting, gears, belts, pulleys, or other parts used for transmitting power to the machine, and shall include prime movers.

(20) "Prime movers" includes steam, gas, oil, and air engines or motors, and steam and hydraulic turbines.

(21) "Point of operation" means the point or points at which clothes or other textiles are inserted or manipulated in the operation of the machine.

[Order 74-18, § 296-303-01003, filed 5/6/74.]

WAC 296-303-020 Point-of-operation guards—Scope and application. All sections of this chapter which include WAC 296-303-020 in the section number apply to point-of-operation guards.

[Order 74-18, § 296-303-020, filed 5/6/74.]

WAC 296-303-02001 Washroom machines. (1) Marking machine. Each power marking machine shall be equipped with a spring-compression device of such design as to prevent injury to fingers, should they be caught between the marking plunger and platen; or the marking machine shall be equipped with a control mechanism that will require the simultaneous action of both hands to operate the machine; or there shall be a guard that will act as a barrier in front of, and which will prevent the operator's fingers from coming into contact with the marking plunger.

(2) Washing machine.

(a) Each washing machine shall be equipped with an interlocking device that will prevent the inside cylinder from moving under power when the outer door on the case or shell is open, and will also prevent the door from being opened while the inside cylinder is in motion. This device

should not prevent the movement of the inner cylinder under the action of a hand-operated mechanism or under the operation of an "inching device."

(b) Each washing machine shall be provided with means for holding open the doors or covers of inner and outer cylinders or shells while being loaded or unloaded. Spring loaded devices are an acceptable means.

(3) Extractor.

(a) Each extractor shall be equipped with a metal cover.

(b) Each extractor shall be equipped with an interlocking device that will prevent the cover from being opened while the basket is in motion, and will also prevent the power operation of the basket while the cover is not fully closed and secured. This device should not prevent the movement of the basket by hand to ensure an even loading.

(c) Each extractor shall also be effectively secured in position on the floor or foundation so as to eliminate unnecessary vibrations, and shall not be operated at a speed greater than that given in the manufacturer's rating, which shall be stamped on the inside of the basket where it is easily visible, in letters not less than one-fourth inch in height. The maximum permissible speed shall be given in revolutions per minute.

(d) Each engine individually driving an extractor shall be provided with an engine stop approved as specified in WAC 296-24-006, of the general safety and health standards, and a speed-limit governor. It is suggested that where an extractor is driven by a direct-current motor a "no field" release be installed to prevent overspeed, which may result from an open or broken field.

(4) Power wringer. Each power wringer shall be equipped with a safety bar or other guard across the entire front of the feed or first pressure rolls, so arranged that the striking of the bar or guard by the hand of the operator or other person will stop the machine.

[Order 74-18, § 296-303-02001, filed 5/6/74.]

WAC 296-303-02003 Starching and drying machines. (1) Starching machine (cylinder or box type). Each starching machine, cylinder or box type, shall be enclosed or guarded so as to prevent the operator or other person from coming into accidental contact with the cylinder or box while the machine is in motion.

(2) Drying-room fan. Each drying-room fan, any part of which is within 7 feet of the floor or working platform, shall be guarded with wire mesh or screen of not less than No. 16 gauge, the openings of which will reject a ball one-half inch in diameter.

(3) Drying tumbler.

(a) Each drying tumbler shall be equipped with an interlocking device that will prevent the inside cylinder from moving under power when the outer door on the case or shell is open, and also prevent the door from being opened while the inside cylinder is in motion. This device should not prevent the movement of the inner cylinder under the action of a hand-operated mechanism or under the operation of an inching device.

(b) Each drying tumbler shall be provided with means for holding open the doors or covers of inner and outer cylinders or shells while being loaded or unloaded.

(4) Shaker (clothes tumbler).

(a) Each shaker or clothes tumbler of the single-cylinder type shall be equipped with a device that will automatically prevent the tumbler from moving while the door is open.

(b) The tumbler shall also be enclosed or guarded so as to prevent accidental contact by the operator or other person while the machine is in motion.

(c) Each shaker or clothes tumbler of the double-cylinder type shall be equipped with an interlocking device that will prevent the inside cylinder from moving when the outer door on the case or shell is open and will also prevent the door from being opened while the inside cylinder is in motion. This device should not prevent the movement of the inner cylinder under the action of a hand-operated mechanism or under the operation of an inching device.

(d) Each shaker or clothes tumbler of the double-cylinder type shall be provided with means for holding open the doors or covers of inner and outer cylinders or shells while being loaded or unloaded.

(5) Exception. Provisions of (3), (4)(a), (c) and (d) of this section shall not apply to shakeout or conditioning tumblers where the clothes are loaded into the open end of the revolving cylinder and are automatically discharged out of the opposite end.

[Order 74-18, § 296-303-02003, filed 5/6/74.]

WAC 296-303-02005 Finishing machines. (1) Dampening machine. Each roll-dampening machine shall be so equipped that the rolls will be entirely enclosed and so arranged as to prevent the fingers of the operator or other person from being caught between the rolls. This may be accomplished by:

(a) A slot or hopper;

(b) A rod or strip located directly in front of the feed and extending the full length of the rolls.

(2) Ironer.

(a) Each flat-work or collar ironer shall be equipped with a safety bar or other guard across the entire front of the feed or first pressure rolls, so arranged that the striking of the bar or guard by the hand of the operator or other person will stop the machine. The pressure rolls shall be covered or guarded so that the operator or other person cannot reach into the rolls without removing the guard. This may be either a vertical guard on all sides or a complete cover. If a vertical guard is used, the distance from the floor or working platform to the top of guard shall be not less than six feet.

(b) Each body-type ironer, roll or shoe type, including sleeve and band ironers, shall be equipped with a safety bar or other guard across the entire length of the feed roll or shoe, so arranged that the striking of the bar or guard by the hand of the operator or other person will stop the machine. The hot roll or shoe shall also be covered in such a way that the operator or other person cannot come into contact with the heated surfaces.

(c) Each combined rotary-bosom and coat ironer shall be equipped with a safety bar or other guard across the entire length of the feed roll or shoe, so arranged that the striking of the bar or guard by the hand of the operator or other person will stop the machine. The hot roll or shoe shall also be covered in such a way that the operator or other person cannot come into contact with the heated surfaces.

(d) Each ironing press (excluding hand or foot powered ones) shall be equipped with a guard or means that will prevent the fingers of the operator or other person from being caught between the ironing surfaces.

[Order 74-18, § 296-303-02005, filed 5/6/74.]

WAC 296-303-02007 Miscellaneous machines and equipment. (1) Sewing machine. Each sewing machine shall be equipped with a guard permanently attached to the machine, so that the operator's fingers cannot pass under the needle. It shall be of such form that the needle can be conveniently threaded without removing the guard. This requirement will not apply to domestic-type sewing machines having a presser-foot which is in the "down" position during operation of the machine.

(2) Exhaust or ventilating fans. Each exhaust or ventilating fan within seven feet of the floor or working platform shall be completely covered with wire mesh of not less than No. 16 gauge, and with openings that will reject a ball one-half inch in diameter.

(3) Steam pipes.

(a) All steam pipes that are within seven feet of the floor or working platform, and with which the worker may come into contact, shall be insulated or covered with a heat-resistive material or shall be guarded to prevent direct contact with the worker.

(b) Where pressure-reducing valves are used, one or more relief or safety valves shall be provided on the low-pressure side of the reducing valve, in case the piping or equipment on the low-pressure side does not meet the requirements for full initial pressure. The relief or safety valve shall be located adjacent to, or as close as possible to, the reducing valve. Relief and safety valves vented to the atmosphere shall be so constructed as to prevent injury or damage caused by fluid escaping from relief or safety valves. The vents shall be of ample size and as short and direct as possible. The combined discharge capacity of the relief valves shall be such that the pressure rating of the lower-pressure piping and equipment will not be exceeded if the reducing valve sticks or fails to open.

[Statutory Authority: Chapter 49.17 RCW. 89-11-035 (Order 89-03), § 296-303-02007, filed 5/15/89, effective 6/30/89; Order 74-18, § 296-303-02007, filed 5/6/74.]

WAC 296-303-025 Operating rules—Scope and application. All sections of this chapter which include WAC 296-303-025 in the section number apply to operating rules.

[Order 74-18, § 296-303-025, filed 5/6/74.]

WAC 296-303-02501 General. (1) Floors.

(a) The floors of every room in a laundry that are used for washing purposes shall be properly constructed of cement, tile, or similar material. The floors shall be watertight, free from projections, crevices, or dangerous gradients. They shall be maintained in good repair and so drained that no water may accumulate.

(b) The floors of every room except washrooms shall be constructed of hardwood or any impervious material, free from protruding nails, splinters, or loose boards, and shall be so maintained.

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(2) Table tops, shelves, and machine woodwork. Table tops, shelves, and machine woodwork shall be constructed of materials properly surfaced, finished free from splinters, and so maintained.

(3) Markers. Markers and others handling soiled clothes shall be warned against touching the eyes, mouth, or any part of the body on which the skin has been broken by a scratch or abrasion; and they shall be cautioned not to touch or eat food until their hands have been thoroughly washed.

(4) Ventilation. Where artificial ventilation is necessary to the maintenance of comfortable working conditions, an adequate ventilating system shall be installed as specified in WAC 296-62-110 of the general occupational health standards.

(5) Instruction of employees. Employees shall be properly instructed as to the hazards of their work and be instructed in safe practices, by bulletins, printed rules, and verbal instructions.

[Order 74-18, § 296-303-02501, filed 5/6/74.]

WAC 296-303-02503 Mechanical. (1) Safety guards.

(a) No safeguard, safety appliance, or device attached to, or forming an integral part of any machinery shall be removed or made ineffective except for the purpose of making immediate repairs or adjustments. Any such safeguard, safety appliance, or device removed or made ineffective during the repair or adjustment of such machinery shall be replaced immediately upon the completion of such repairs or adjustments.

(b) No machine shall be operated until such repairs and adjustments have been made and the machine is in good working condition.

(2) Steam-pressure apparatus. Steam machines shall not be operated at a pressure above that given by the manufacturer's pressure rating as shown on name plate. If the steam source is at a pressure higher than that given by the manufacturer's rating, a stop valve, reducing valve, pressure gauge, and safety valve shall be installed, in the order named, from the source. The safety valve shall be located in a nonhazardous place.

(3) Machine adjustments. No moving parts of any machine shall be oiled, cleaned, adjusted, or repaired while said machine is in operation or in motion except that the rolls of adjusting machines not equipped with hand-power means shall be operated at the slowest speed possible with an operator constantly at the starting mechanism.

(4) Extractors. Each extractor shall be dismantled and inspected at least once a year and, if necessary, repaired. Overdriven extractors, if provided with handholes through which basket and rings can be inspected, need not be dismantled.

[Order 74-18, § 296-303-02503, filed 5/6/74.]

WAC 296-303-030 Moving parts. (1) Machine guarding (other than point of operation). Moving parts of machines, such as gears, sprockets, belts, pulleys, and shafts, shall be guarded in accordance with the requirements of WAC 296-24-20507 through 296-24-20513, of the general safety and health standards.

(2) Prime-mover guarding. Moving parts of prime movers such as fly-wheels, cranks and connecting rods, tail

rods or extension piston rods, and governor balls, shall be guarded in accordance with the requirements of WAC 296-24-20505, of the general safety and health standards.

[Order 74-18, § 296-303-030, filed 5/6/74.]

WAC 296-303-040 Starting and stopping devices.

(1) Each power-driven machine shall be provided with means for disconnecting from the source of power. Starting and stopping devices for machines shall be so located as to be operable from the front of the machine, and so constructed as to allow proper guarding of belts and pulleys.

(2) Doors of washing machines, extractors, and tumbler/shaker dryer machines, shall have a cut-off micro switch or other method to shut-off power when loading doors are opened, making inner cylinder, tumbler, or shaker mechanisms inoperative while the door is open. In those situations where the cylinder or mechanism continues to rotate/move, and present a hazard after the power is off, an interlocking device, breaking switch, or a time-delay switch is additionally required to prevent injury.

[Statutory Authority: Chapter 49.17 RCW. 89-11-035 (Order 89-03), § 296-303-040, filed 5/15/89, effective 6/30/89; Order 74-18, § 296-303-040, filed 5/6/74.]

Chapter 296-304 WAC

SAFETY STANDARDS FOR SHIP REPAIRING, SHIPBUILDING AND SHIPBREAKING

WAC

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296-304-070	Gear and equipment for rigging and materials handling—Scope and application.
296-304-07001	Inspection.
296-304-07003	Ropes, chains and slings.
296-304-07005	Shackles and hooks.
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296-304-07009	Hoisting and hauling equipment.
296-304-07011	Use of gear.
296-304-07013	Qualifications of operators.
296-304-080	Tools and related equipment—Scope and application.
296-304-08001	General precautions.
296-304-08003	Portable electric tools.
296-304-08005	Hand tools.
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296-304-08009	Powder actuated fastening tools.
296-304-08011	Internal combustion engines, other than ship's equipment.
296-304-090	Personal protective equipment—Scope and application.
296-304-09001	Eye protection.
296-304-09003	Respiratory protection.
296-304-09005	Head, foot and body protection.
296-304-09007	Lifesaving equipment.
296-304-100	Ship's machinery and piping systems—Scope and application.
296-304-10001	Ship's boilers.
296-304-10003	Ship's piping systems.
296-304-10005	Ship's propulsion machinery.
296-304-10007	Ship's deck machinery.
296-304-110	Portable, unfired pressure vessels, drums and containers, other than ship's equipment—Scope and application.
296-304-11001	Portable air receivers and other unfired pressure vessels.
296-304-11003	Drums and containers.
296-304-120	Electrical machinery—Electrical circuits and distribution boards.
296-304-130	Gear certification—General provisions.
296-304-13001	Purpose and scope.
296-304-13003	Definitions of terms.
296-304-140	Procedure governing accreditation—Scope and application.
296-304-14001	Application for accreditation.
296-304-14003	Action upon application.
296-304-14005	Duration and renewal of accreditation.
296-304-14007	Criteria governing accreditation to certificate vessels' cargo gear.
296-304-14009	Voluntary amendment or termination of accreditation.
296-304-14011	Suspension or revocation of accreditation.
296-304-14013	Reconsideration and review.
296-304-150	Duties of persons accredited to certificate vessels' cargo gear—Scope and application.
296-304-15001	General duties—Exemptions.
296-304-15003	Recordkeeping and related procedures concerning records in custody of accredited persons.
296-304-15005	Recordkeeping and related procedures concerning records in custody of the vessel.

296-304-160	Certification of vessels' cargo gear—Scope and application.
296-304-16001	General.
296-304-16003	Initial tests of cargo gear and tests after alterations, renewals or repairs.
296-304-16005	Periodic tests, examinations and inspections.
296-304-16007	Heat treatment.
296-304-16009	Exemptions from heat treatment.
296-304-16011	Grace periods.
296-304-16013	Gear requiring welding.
296-304-16015	Damaged components.
296-304-16017	Marking and posting of safe working loads.
296-304-16019	Requirements governing braking devices and power sources.
296-304-16021	Means of derrick attachment.
296-304-16023	Limitations on use of wire rope.
296-304-16025	Limitations on use of chains.
296-304-170	Certification of vessels—Tests and proof loads—Heat treatment—Competent persons—Scope and application.
296-304-17001	Visual inspection before tests.
296-304-17003	Unit proof test—Winches, derricks and gear accessory thereto.
296-304-17005	Unit proof tests—Cranes and gear accessory thereto.
296-304-17007	Limitations on safe working loads and proof loads.
296-304-17009	Examinations subsequent to unit tests.
296-304-17011	Proof tests—Loose gear.
296-304-17013	Specially designed blocks and components.
296-304-17015	Proof tests—Wire rope.
296-304-17017	Proof tests after repairs or alterations.
296-304-17019	Order of tests.
296-304-17021	Heat treatment.
296-304-17023	Competent persons.
296-304-180	Accreditation to certificate shore-based equipment—Scope and application.
296-304-18001	Eligibility for accreditation to certificate shore-based material handling devices covered by chapter 296-56 WAC of the safety and health regulations for longshoring.
296-304-18003	Provisions respecting application for accreditation, action upon the application, and related matters.
296-304-190	Duties of persons accredited to certificate shore-based material handling devices—General duties, exemptions.
296-304-200	Certification of shore-based material handling devices—Scope and application.
296-304-20001	General provisions.
296-304-20003	Unit proof test and examination of cranes.
296-304-20005	Annual examination of cranes.
296-304-20007	Unit proof test and examination of derricks.
296-304-20009	Annual examination of derricks.
296-304-20011	Determination of crane or derrick safe working loads and limitations in absence of manufacturer's data.
296-304-20013	Safe working load reduction.
296-304-20015	Safe working load increase.
296-304-20017	Nondestructive examination.
296-304-20019	Wire rope.
296-304-20021	Heat treatment.
296-304-20023	Examination of bulk cargo loading or discharging spouts or suckers.
296-304-20025	Documentation.

WAC 296-304-010 Scope and application. (1) The provisions and standards of the general safety and health standards, chapters 296-24 and 296-62 WAC, and such other codes and standards as are promulgated by the department of labor and industries which are applicable to all industries, shall be applicable in the ship repairing, shipbuilding, or shipbreaking industries whenever the employees are covered under the Washington State Industrial Safety and Health Act, chapter 49.17 RCW. The rules of this chapter and the rules of the aforementioned chapters 296-24 and 296-62 WAC are applicable to all ship repairing, shipbuilding, and shipbreak-

ing industries and operations, provided that such rules shall not be applicable to those operations under the exclusive safety jurisdiction of the federal government.

(2) The responsibility for compliance with these regulations is placed upon "employers" as defined in WAC 296-304-01001(3).

(3) It is not the intent of these regulations to place additional responsibilities or duties on owners, operators, agents or masters of vessels unless such persons are acting as employers, nor is it the intent of these regulations to relieve such owners, operators, agents or masters of vessels from responsibilities or duties now placed upon them by law, regulation or custom.

(4) The responsibilities placed upon the competent person herein shall be deemed to be the responsibilities of the employer.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 95-22-015, § 296-304-010, filed 10/20/95, effective 1/16/96. Statutory Authority: Chapter 49.17 RCW. 95-04-006, § 296-304-010, filed 1/18/95, effective 3/10/95; 89-11-035 (Order 89-03), § 296-304-010, filed 5/15/89, effective 6/30/89; Order 75-6, § 296-304-010, filed 3/10/75; Order 74-25, § 296-304-010, filed 5/7/74.]

WAC 296-304-01001 Definitions. (1) "Shall" indicates provisions which are mandatory.

(2) "Director" means the director of the department of labor and industries or his/her designated representative.

(3) "Employer" means an employer any of whose employees are employed, in whole or in part, in ship repair or related employments as defined in these standards on the navigable waters of the United States, including dry docks, graving docks and marine railways.

(4) "Employee" means any person engaged in ship repairing, shipbuilding, or shipbreaking or related employments on the navigable waters of the United States, including dry docks, graving docks and marine railways, other than the master, ship's officers, crew of the vessel, or any person engaged by the master to repair any vessel under 18 net tons.

(5) "Gangway" means any ramp-like or stair-like means of access provided to enable personnel to board or leave a vessel including accommodation ladders, gangplanks and brows.

(6) "Vessel" includes every description of watercraft or other artificial contrivance used, or capable of being used, as a means of transportation on water, including special purpose floating structures not primarily designed for or used as a means of transportation on water.

(7) For purposes of WAC 296-304-05007, the term "barge" means an unpowered, flat bottom, shallow draft vessel including scows, carfloats and lighters. For purposes of these standards, the term does not include ship shaped or deep draft barges.

(8) For purposes of WAC 296-304-05007, the term "river tow boat" means a shallow draft, low free board, self-propelled vessel designed to tow river barges by pushing ahead. For purposes of these standards, the term does not include other towing vessels.

(9) "Shipbreaking" means any breaking down of a vessel's structure for the purpose of scrapping the vessel, including the removal of gear, equipment or any component part of a vessel.

(10) "Shipbuilding" means the construction of a vessel, including the installation of machinery and equipment.

(11) "Ship repair" means any repair of a vessel including, but not restricted to, alterations, conversions, installations, cleaning, painting, and maintenance work.

(12) "Related employment" means any employment performed as an incident to or in conjunction with ship repairing, shipbuilding or shipbreaking work, including, but not restricted to, inspection, testing and employment as a watchman.

(13) "Hazardous substance" means a substance which by reason of being explosive, flammable, poisonous, corrosive, oxidizing, irritant, or otherwise harmful is likely to cause injury.

(14) "Competent person" means a person who is capable of recognizing and evaluating employee exposure to hazardous substances or to other unsafe conditions and is capable of specifying the necessary protection and precautions to be taken to ensure the safety of employees as required by the particular regulation under the condition to which it applies. For the purposes of WAC 296-304-020, explosives and other dangerous atmospheres, WAC 296-304-030, surface preparation and preservation, and WAC 296-304-040, welding, cutting and heating, except for WAC 296-304-03007 (2)(h) and 296-304-03009 (1)(e), to which the above definition applies, the competent person must also meet the additional requirements of WAC 296-304-01005, Competent person.

(15) "Confined space" means a compartment of small size and limited access such as a double bottom tank, cofferdam, or other space which by its small size and confined nature can readily create or aggravate a hazardous exposure.

(16) "Enclosed space" means any space, other than a confined space, which is enclosed by bulkheads and overhead. It includes cargo holds, tanks, quarters, and machinery and boiler spaces.

(17) "Hot-work" means riveting, welding, burning or other fire or spark producing operations.

(18) "Cold-work" means any work which does not involve riveting, welding, burning or other fire or spark producing operations.

(19) "Portable unfired pressure vessel" means any pressure container or vessel used aboard ship, other than the ship's equipment, containing liquids or gases under pressure, excepting pressure vessels built to ICC regulations under 49 CFR Part 78, Subparts C and H.

(20) "Powder actuated fastening tool" means a tool or machine which drives a stud, pin, or fastener by means of an explosive charge.

(21) For purposes of WAC 296-304-06013, the term "hazardous material" means a material which has one or more of the following characteristics: (a) Has a flash point below 140°F., closed cup, or is subject to spontaneous heating; (b) has a threshold limit value below 500 p.p.m. in the case of a gas or vapor, below 500 mg./m.³ for fumes, and below 25 m.p.p.c.f. in case of a dust; (c) has a single dose oral LD₅₀ below 500 mg./kg.; (d) is subject to polymerization with the release of large amounts of energy; (e) is a strong oxidizing or reducing agent; (f) causes first degree burns to skin in short time exposure, or is systemically toxic by skin contact; or (g) in the course of normal operations,

may produce dusts, gases, fumes, vapors, mists, or smokes which have one or more of the above characteristics.

[Statutory Authority: Chapter 49.17 RCW. 95-04-006, § 296-304-01001, filed 1/18/95, effective 3/10/95; Order 76-7, § 296-304-01001, filed 3/1/76; Order 74-25, § 296-304-01001, filed 5/7/74.]

WAC 296-304-01003 Reference specifications, standards, and codes. Specifications, standards, and codes of agencies of the U.S. government, to the extent specified in the text, form a part of these regulations. In addition, the specifications, standards, and codes of organizations which are not agencies of the U.S. government, in effect on the date of the promulgation of these regulations as listed below, to the extent specified in the text, form a part of these standards:

National Fire Protection Association, 60 Batterymarch Street, Boston, Mass. 02110,

Underwriters' Laboratories, Inc., 207 East Ohio Street, Chicago, Ill. 60611,

United States of America Standard Safety Code for Portable Wood Ladders, A14.1-1959, United States of America Standards Institute, Inc., 10 East 40th Street, New York, N.Y. 10016,

United States of America Standard Safety Code for Portable Metal Ladders, A14.2-1956, United States of America Standards Institute, Inc., 10 East 40th Street, New York, N.Y. 10016,

United States of America Standard Safety Code for Head, Eye, and Respiratory Protection, Z2.1-1959, United States of America Standards Institute, Inc., 10 East 40th Street, New York, N.Y. 10016,

American Society of Mechanical Engineers, Boiler and Pressure Vessel Code, Section VIII, Rules for Construction of Unfired Pressure Vessels, American Society of Mechanical Engineers, 345 East 47th Street, New York, N.Y. 10017,

Threshold Limit Values, American Conference of Governmental Industrial Hygienists, 1014 Broadway, Cincinnati, Ohio 45202,

United States of America Standards Safety Code for the Use, Care, and Protection of Abrasive Wheels, B7.1-1964, United States of America Standards Institute, Inc., 10 East 40th Street, New York, N.Y. 10016.

[Order 74-25, § 296-304-01003, filed 5/7/74.]

WAC 296-304-01005 Competent person. (1) Application. This section applies to shipyard employment. (2) Designation.

(a) One or more competent persons shall be designated by the employer in accordance with the applicable requirements of this section, unless the requirements of WAC 296-304-020 through 296-304-02011, WAC 296-304-030 through 296-304-03009, WAC 296-304-040 through 296-304-04013, and WAC 296-304-080 through 296-304-08011, are always carried out by a marine chemist.

Exception: The employer may designate any person who meets the applicable portions of the criteria set forth in subsection (3) of this section as a competent person who is limited to performing testing to the following situations:

(i) Repair work on small craft in boat yards where only combustible gas indicator tests are required for fuel tank leaks or when using flammable paints below decks;

(ii) Building of wooden vessels where only knowledge of the precautions to be taken when using flammable paints is required;

(iii) The breaking of vessels where there is no fuel oil or other flammable hazard; and

(iv) Tests and inspections performed to comply with WAC 296-304-03007 (2)(h) and 296-304-03009 (1)(e).

(b) The employer shall maintain either a roster of designated competent persons or a statement that a marine chemist will perform the tests or inspections which require a competent person.

(c) The employer shall make the roster of designated persons or the statement available to employees, the employee's representative, or the director upon request.

(d) The roster shall contain, as a minimum, the following:

(i) The employer's name;

(ii) The designated competent person's name(s); and

(iii) The date the employee was trained as a competent person.

(3) Criteria. The employer shall ensure that each designated competent person has the following skills and knowledge:

(a) Ability to understand and carry out written or oral information or instructions left by marine chemist, Coast Guard authorized persons and certified industrial hygienists;

(b) Knowledge of WAC 296-304-020 through 296-304-02011, WAC 296-304-030 through 296-304-03009, WAC 296-304-040 through 296-304-04013, and WAC 296-304-080 through 296-304-08011;

(c) Knowledge of the structure, location, and designation of spaces where work is done;

(d) Ability to calibrate and use testing equipment including but not limited to, oxygen indicators, combustible gas indicators, carbon monoxide indicators, and carbon dioxide indicators, and to interpret accurately the test results of that equipment;

(e) Ability to perform all required tests and inspections which are or may be performed by a competent person as set forth in WAC 296-304-020 through 296-304-02011, WAC 296-304-030 through 296-304-03009, WAC 296-304-040 through 296-304-04013, and WAC 296-304-080 through 296-304-08011;

(f) Ability to inspect, test, and evaluate spaces to determine the need for further testing by a marine chemist or a certified industrial hygienist; and

(g) Ability to maintain records required by this section.

(4) Recordkeeping.

(a) When tests and inspections are performed by a competent person, marine chemist, or certified industrial hygienist as required by any provisions of WAC 296-304-020 through 296-304-02011, WAC 296-304-030 through 296-304-03009, WAC 296-304-040 through 296-304-04013, or WAC 296-304-080 through 296-304-08011, the employer shall ensure that the person performing the test and inspection records the location, time, date, location of inspected spaces, and the operations performed, as well as the test results and any instructions.

(b) The employer shall ensure that the records are posted in the immediate vicinity of the affected operations while work in the spaces is in progress. The records shall be kept on file for a period of at least three months from the completion date of the specific job for which they were generated.

(c) The employer shall ensure that the records are available for inspection by the director, and employees and their representatives.

[Statutory Authority: Chapter 49.17 RCW. 95-04-006, § 296-304-01005, filed 1/18/95, effective 3/10/95.]

WAC 296-304-020 Confined and enclosed spaces and other dangerous atmospheres in shipyard employment. Scope, application and definitions applicable to this subsection: (1) Scope and application. This section applies to work in confined and enclosed spaces and other dangerous atmospheres in shipyard employment, including vessels, vessel sections, and on land-side operations regardless of geographic location.

(2) Definitions applicable to this section:

Adjacent spaces means those spaces bordering a subject space in all directions, including all points of contact, corners, diagonals, decks, tank tops, and bulkheads.

Certified industrial hygienist (CIH) means an industrial hygienist who is certified by the American Board of Industrial Hygiene.

Coast Guard authorized person means an individual who meets the requirement of WAC 296-304-02015, Appendix B, for tank vessels, for passenger vessels, and for cargo and miscellaneous vessels.

Dangerous atmosphere means an atmosphere that may expose employees to the risk of death, incapacitation, impairment of ability to self-rescue (i.e., escape unaided from a confined or enclosed space), injury, or acute illness.

Director means the director of the department of labor and industries or his/her designated representative.

Enter with restrictions denotes a space where entry for work is permitted only if engineering controls, personal protective equipment, clothing, and time limitations are as specified by the marine chemist, certified industrial hygienist, or the shipyard competent person.

Entry means the action by which a person passes through an opening into a space. Entry includes ensuing work activities in that space and is considered to have occurred as soon as any part of the entrant's body breaks the plane of an opening into the space.

Hot work means any activity involving riveting, welding, burning, the use of powder-actuated tools or similar fire-producing operations. Grinding, drilling, abrasive blasting, or similar spark-producing operations are also considered hot work except when such operations are isolated physically from any atmosphere containing more than 10 percent of the lower explosive limit of a flammable or combustible substance.

Immediately dangerous to life or health (IDLH) means an atmosphere that poses an immediate threat to life or that is likely to result in acute or immediate severe health effects.

Inert or inerted atmosphere means an atmospheric condition where:

(a) The oxygen content of the atmosphere in the space is maintained at a level equal to or less than 8.0 percent by volume or at a level at or below 50 percent of the amount required to support combustion, whichever is less; or

(b) The space is flooded with water and the vapor concentration of flammable or combustible materials in the free space atmosphere above the water line is less than 10 percent of the lower explosive limit for the flammable or combustible material.

Labeled means identified with a sign, placard, or other form of written communication, including pictograms, that provides information on the status or condition of the work space to which it is attached.

Lower explosive limit (LEL) means the minimum concentration of vapor in air below which propagation of a flame does not occur in the presence of an ignition source.

Marine chemist means an individual who possesses a current marine chemist certificate issued by the National Fire Protection Association (NFPA).

NFPA means National Fire Protection Association.

Nationally Recognized Testing Laboratory (NRTL) means an organization recognized by OSHA, in accordance with Appendix A of 29 CFR 1910.7, which tests for safety and lists or labels or accepts equipment and materials that meet all the criteria found in Section 1910.7(b)(1) through (b)(4)(ii).

Not safe for hot work denotes a space where hot work may not be performed because the conditions do not meet the criteria for "safe for hot work."

Not safe for workers denotes a space where an employee may not enter because the conditions do not meet the criteria for "safe for workers."

Oxygen-deficient atmosphere means an atmosphere having an oxygen concentration of less than 19.5 percent by volume.

Oxygen-enriched atmosphere means an atmosphere that contains 22.0 percent or more oxygen by volume.

Safe for hot work denotes a space that meets all of the following criteria:

(a) The oxygen content of the atmosphere does not exceed 22.0 percent by volume;

(b) The concentration of flammable vapors in the atmosphere is less than 10 percent of the lower explosive limit;

(c) The residues or materials in the space are not capable of producing a higher concentration than permitted in (a) or (b) of the above, under existing atmospheric conditions in the presence of hot work and while maintained as directed by the marine chemist or competent person; and

(d) All adjacent spaces have been cleaned, or inerted, or treated sufficiently to prevent the spread of fire.

Safe for workers denotes a space that meets the following criteria:

(a) The oxygen content of the atmosphere is at least 19.5 percent and below 22.0 percent by volume;

(b) The concentration of flammable vapors is below 10 percent of the lower explosive limit (LEL);

(c) Any toxic materials in the atmosphere associated with cargo, fuel, tank coatings, or inerting media are within permissible concentrations at the time of the inspection; and

(d) Any residues or materials associated with the work authorized by the marine chemist, certified industrial

hygienist, or competent person will not produce uncontrolled release of toxic materials under existing atmospheric conditions while maintained as directed.

Space means an area on a vessel or vessel section or within a shipyard such as, but not limited to: Cargo tanks or holds; pump or engine rooms; storage lockers; tanks containing flammable or combustible liquids, gases, or solids; rooms within buildings; crawl spaces; tunnels; or accessways. The atmosphere within a space is the entire area within its bounds.

Upper explosive limit (UEL) means the maximum concentration of flammable vapor in air above which propagation of flame does not occur on contact with a source of ignition.

Vessel section means a subassembly, module, or other component of a vessel being built, repaired, or broken.

Visual inspection means the physical survey of the space, its surroundings and contents to identify hazards such as, but not limited to, restricted accessibility, residues, unguarded machinery, and piping or electrical systems.

[Statutory Authority: Chapter 49.17 RCW. 95-04-006, § 296-304-020, filed 1/18/95, effective 3/10/95; 93-04-111 (Order 92-15), § 296-304-020, filed 2/3/93, effective 3/15/93; Order 74-25, § 296-304-020, filed 5/7/74.]

WAC 296-304-02001 Reserved.

[Statutory Authority: Chapter 49.17 RCW. 95-04-006, § 296-304-02001, filed 1/18/95, effective 3/10/95; Order 76-7, § 296-304-02001, filed 3/1/76; Order 74-25, § 296-304-02001, filed 5/7/74.]

WAC 296-304-02003 Precautions and the order of testing before entering confined and enclosed spaces and other dangerous atmospheres. The employer shall ensure that atmospheric testing is performed in the following sequence: Oxygen content, flammability, toxicity.

(1) Oxygen content.

(a) The employer shall ensure that the following spaces are visually inspected and tested by a competent person to determine the atmosphere's oxygen content prior to initial entry into the space by an employee:

(i) Spaces that have been sealed, such as, but not limited to, spaces that have been coated and closed up, and nonventilated spaces that have been freshly painted;

(ii) Spaces and adjacent spaces that contain or have contained combustible or flammable liquids or gases;

(iii) Spaces and adjacent spaces that contain or have contained liquids, gases, or solids that are toxic, corrosive, or irritant;

(iv) Spaces and adjacent spaces that have been fumigated; and

(v) Spaces containing materials or residues of materials that create an oxygen-deficient atmosphere.

(b) If the space to be entered contains an oxygen deficient atmosphere, the space shall be labeled "not safe for workers" or, if oxygen-enriched, "not safe for workers—not safe for hot work." If an oxygen-deficient or oxygen-enriched atmosphere is found, ventilation shall be provided at volumes and flow rates sufficient to ensure that the oxygen content is maintained at or above 19.5 percent and below 22.0 percent by volume. The warning label may be removed when the oxygen content is equal to or greater than 19.5 and less than 22.0 percent by volume.

(c) An employee may not enter a space where the oxygen content, by volume, is below 19.5 percent or above 22.0 percent.

Exception: An employee may enter for emergency rescue or for a short duration for installation of ventilation equipment necessary to start work in the space provided:

(i) The atmosphere in the space is monitored for oxygen content, by volume, continuously; and

(ii) Respiratory protection and other appropriate personal protective equipment and clothing are provided in accordance with WAC 296-304-090 through 296-304-09007.

Note to (a): Other provisions for work in IDLH atmospheres are located in WAC 296-304-090 through 296-304-09007.

(2) Flammable atmospheres.

(a) The employer shall ensure that spaces and adjacent spaces that contain or have contained combustible or flammable liquids or gases are:

(i) Inspected visually by the competent person to determine the presence of combustible or flammable liquids; and

(ii) Tested by a competent person prior to entry by an employee to determine the concentration of flammable vapors and gases within the space.

(b) If the concentration of flammable vapors or gases in the space to be entered is equal to or greater than 10 percent of the lower explosive limit, the space shall be labeled "not safe for workers" and "not safe for hot work." Ventilation shall be provided at volumes and flow rates sufficient to ensure that the concentration of flammable vapors is maintained below 10 percent of the lower explosive limit. The warning labels may be removed when the concentration of flammable vapors is below 10 percent of the lower explosive limit.

(c) An employee may not enter a space where the concentration of flammable vapors or gases is equal to or greater than 10 percent of the lower explosive limit. Exception: An employee may enter for emergency rescue or for a short duration for installation of ventilation equipment necessary to start work in the space, provided:

(i) No ignition sources are present;

(ii) The atmosphere in the space is monitored continuously;

(iii) Atmospheres at or above the upper explosive limit are maintained; and

(iv) Respiratory protection and other appropriate personal protective equipment and clothing are provided in accordance with WAC 296-304-090 through 296-304-09007.

Note 1 to (2): Additional provisions for work in IDLH atmospheres are located in WAC 296-304-090 through 296-304-09007.

Note 2 to (2): Additional provisions for work in spaces containing a flammable substance which also has a permissible exposure limit, are located in subsection (3) of this section and chapter 296-62 WAC, Part H.

(3) Toxic, corrosive, irritant or fumigated atmospheres and residues.

(a) The employer shall ensure that spaces or adjacent spaces that contain or have contained liquids, gases, or solids that are toxic, corrosive or irritant are:

(i) Inspected visually by the competent person to determine the presence of toxic, corrosive, or irritant residue contaminants; and

(ii) Tested by a competent person prior to initial entry by an employee to determine the air concentration of toxics, corrosives, or irritants within the space.

(b) If a space contains an air concentration of a material which exceeds a chapter 296-62 WAC, Part H, permissible exposure limit (PEL) or is IDLH, the space shall be labeled "not safe for workers." Ventilation shall be provided at volumes and flow rates which will ensure that air concentrations are maintained within the PEL or, in the case of contaminants for which there is no established PEL, below the IDLH. The warning label may be removed when the concentration of contaminants is maintained within the PEL or below IDLH level.

(c) If a space cannot be ventilated to within the PELs or is IDLH, a marine chemist or CIH must re-test until the space can be certified "enter with restrictions" or "safe for workers."

(d) An employee may not enter a space whose atmosphere exceeds a PEL or is IDLH.

Exception: An employee may enter for emergency rescue, or for a short duration for installation of ventilation equipment provided:

(i) The atmosphere in the space is monitored continuously;

(ii) Respiratory protection and other necessary and appropriate personal protective equipment and clothing are provided in accordance with WAC 296-304-090 through 296-304-09007.

Note to (3): Other provisions for work in IDLH atmospheres are located in WAC 296-304-090 through 296-304-09007.

(4) Training of employees entering confined and enclosed spaces or other dangerous atmospheres.

(a) The employer shall ensure that each employee that enters a confined or enclosed space and other areas with dangerous atmospheres is trained to perform all required duties safely.

(b) The employer shall ensure that each employee who enters a confined space, enclosed space, or other areas with dangerous atmospheres is trained to:

(i) Recognize the characteristics of the confined space;

(ii) Anticipate and be aware of the hazards that may be faced during entry;

(iii) Recognize the adverse health effects that may be caused by the exposure to a hazard;

(iv) Understand the physical signs and reactions related to exposures to such hazards;

(v) Know what personal protective equipment is needed for safe entry into and exit from the space;

(vi) Use personal protective equipment; and

(vii) Where necessary, be aware of the presence and proper use of barriers that may be needed to protect an entrant from hazards.

(c) The employer shall ensure that each entrant into confined or enclosed spaces or other dangerous atmospheres is trained to exit the space or dangerous atmosphere whenever:

(i) The employer or his or her representative orders evacuation;

(ii) An evacuation signal such as an alarm is activated;

or

(iii) The entrant perceives that he or she is in danger.

(d) The employer shall provide each employee with training:

(i) Before the entrant begins work addressed by this chapter; and

(ii) Whenever there is a change in operations or in an employee's duties that presents a hazard about which the employee has not previously been trained.

(e) The employer shall certify that the training required by (a) through (d) of this subsection has been accomplished.

(i) The certification shall contain the employee's name, the name of the certifier, and the date(s) of the certification.

(ii) The certification shall be available for inspection by the director, employees, and their representatives.

(5) Rescue teams. The employer shall either establish a shipyard rescue team or arrange for an outside rescue team which will respond promptly to a request for rescue service.

(a) Shipyard rescue teams shall meet the following criteria:

(i) Each employee assigned to the shipyard team shall be provided with and trained to use the personal protective equipment he or she will need, including respirators and any rescue equipment necessary for making rescues from confined and enclosed spaces and other dangerous atmospheres.

(ii) Each employee assigned to the shipyard rescue team shall be trained to perform his or her rescue functions including confined and enclosed and other dangerous atmosphere entry.

(iii) Shipyard rescue teams shall practice their skills at least once every 12 months. Practice drills shall include the use of mannequins and rescue equipment during simulated rescue operations involving physical facilities that approximate closely those facilities from which rescue may be needed.

Note to (5)(a)(iii): If the team performs an actual rescue during the 12 month period, an additional practice drill for that type of rescue is not required.

(iv) At least one person on each rescue team shall maintain current certification in basic first aid which includes maintenance of an airway, control of bleeding, maintenance of circulation and cardiopulmonary resuscitation (CPR) skills.

(b) The employer shall inform outside rescue teams of the hazards that the team may encounter when called to perform confined and enclosed space or other dangerous atmosphere rescue at the employer's facility so that the rescue team can be trained and equipped.

Note to (5): The criteria for in-house rescue, listed in (5)(a) can be used by the employer in evaluating outside rescue services.

(6) Exchanging hazard information between employers. Each employer whose employees work in confined and enclosed spaces or other dangerous atmospheres shall ensure that all available information on the hazards, safety rules, and emergency procedures concerning those spaces and atmospheres is exchanged with any other employer whose employees may enter the same spaces.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 95-22-015, § 296-304-02003, filed 10/20/95, effective 1/16/96. Statutory Authority: Chapter 49.17 RCW. 95-04-006, § 296-304-02003, filed 1/18/95, effective 3/10/95; 93-19-142 (Order 93-04), § 296-304-02003, filed

9/22/93, effective 11/1/93; Order 76-7, § 296-304-02003, filed 3/1/76; Order 74-25, § 296-304-02003, filed 5/7/74.]

WAC 296-304-02005 Cleaning and other cold work.

(1) Locations covered by this section. The employer shall ensure that manual cleaning and other cold work are not performed in the following spaces unless the conditions of subsection (2) of this section have been met:

(a) Spaces containing or having last contained bulk quantities of combustible or flammable liquids or gases; and

(b) Spaces containing or having last contained bulk quantities of liquids, gases or solids that are toxic, corrosive or irritating.

(2) Requirements for performing cleaning or cold work.

(a) Liquid residues of hazardous materials shall be removed from work spaces as thoroughly as practicable before employees start cleaning operations or cold work in a space. Special care shall be taken to prevent the spilling or the draining of these materials into the water surrounding the vessel, or for shore-side operations, onto the surrounding work area.

(b) Testing shall be conducted by a competent person to determine the concentration of flammable, combustible, toxic, corrosive, or irritant vapors within the space prior to the beginning of cleaning or cold work.

(c) Continuous ventilation shall be provided at volumes and flow rates sufficient to ensure that the concentration(s) of:

(i) Flammable vapor is maintained below 10 percent of the lower explosive limit; and

Note to (2)(c)(i): Spaces containing highly volatile residues may require additional ventilation to keep the concentration of flammable vapors below 10 percent of the lower explosive limit and within the permissible exposure limit.

(ii) Toxic, corrosive, or irritant vapors are maintained within the permissible exposure limits and below IDLH levels.

(d) Testing shall be conducted by the competent person as often as necessary during cleaning or cold work to assure that air concentrations are below 10 percent of the lower explosive limit and within the PELs and below IDLH levels. Factors such as, but not limited to, temperature, volatility of the residues and other existing conditions in and about the spaces are to be considered in determining the frequency of testing necessary to assure a safe atmosphere.

Note to (2)(d): See WAC 296-304-02013—Appendix A, for additional information on frequency of testing.

(e) Spills or other releases of flammable, combustible, toxic, corrosive, and irritant materials shall be cleaned up as work progresses.

(f) An employee may not enter a confined or enclosed space or other dangerous atmosphere if the concentration of flammable or combustible vapors in work spaces exceeds 10 percent of the lower explosive limit.

Exception: An employee may enter for emergency rescue or for a short duration for installation of ventilation equipment provided:

(i) No ignition sources are present;

(ii) The atmosphere in the space is monitored continuously;

(iii) The atmosphere in the space is maintained above the upper explosive limit; and

(iv) Respiratory protection, personal protective equipment, and clothing are provided in accordance with WAC 206-304-090 through 296-304-09007.

Note to (2)(f): Other provisions for work in IDLH and other dangerous atmospheres are located in WAC 296-304-090 through 296-304-09007.

(g) A competent person shall test ventilation discharge areas and other areas where discharged vapors may collect to determine if vapors discharged from the spaces being ventilated are accumulating in concentrations hazardous to employees.

(h) If the tests required in (g) of this subsection indicate that concentrations of exhaust vapors that are hazardous to employees are accumulating, all work in the contaminated area shall be stopped until the vapors have dissipated or been removed.

(i) Only explosion-proof, self-contained portable lamps, or other electric equipment approved by a National Recognized Testing Laboratory (NRTL) for the hazardous location shall be used in spaces described in subsection (1) of this section, until such spaces have been certified as "safe for workers."

Note to (2)(i): Battery-fed, portable lamps or other electric equipment bearing the approval of a NRTL for the class, and division of the location in which they are used are deemed to meet the requirements of (i) of this subsection.

(j) The employer shall prominently post signs that prohibit sources of ignition within or near a space that has contained flammable or combustible liquids or gases in bulk quantities:

- (i) At the entrance to those spaces;
- (ii) In adjacent spaces; and
- (iii) In the open area adjacent to those spaces.

(k) All air moving equipment and its component parts, including duct work, capable of generating a static electric discharge of sufficient energy to create a source of ignition, shall be bonded electrically to the structure of a vessel or vessel section or, in the case of land-side spaces, grounded to prevent an electric discharge in the space.

(l) Fans shall have nonsparking blades, and portable air ducts shall be of nonsparking materials.

Note to (2): See WAC 296-304-02003(3) and applicable requirements of chapter 296-62 WAC, general occupational health standards, for other provisions affecting cleaning and cold work.

[Statutory Authority: Chapter 49.17 RCW. 95-04-006, § 296-304-02005, filed 1/18/95, effective 3/10/95; Order 74-25, § 296-304-02005, filed 5/7/74.]

WAC 296-304-02007 Hot work. (1) Hot work requiring testing by a marine chemist or Coast Guard authorized person.

(a) The employer shall ensure that hot work is not performed in or on any of the following confined and enclosed spaces and other dangerous atmospheres, boundaries of spaces or pipelines until the work area has been tested and certified by a marine chemist or a U.S. Coast Guard authorized person as "safe for hot work":

(i) Within, on, or immediately adjacent to spaces that contain or have contained combustible or flammable liquids or gases.

(ii) Within, on, or immediately adjacent to fuel tanks that contain or have last contained fuel; and

(iii) On pipelines, heating coils, pump fittings or other accessories connected to spaces that contain or have last contained fuel.

(iv) Exception: On dry cargo, miscellaneous and passenger vessels and in the landside operations within spaces which meet the standards for oxygen, flammability and toxicity in WAC 296-304-02003, but are adjacent to spaces containing flammable gases or liquids, as long as the gases or liquids have a flash point below 150 deg. F (65.6 deg. C) and the distance between such spaces and the work is 25 feet (7.5 m) or greater.

Note: For flammable liquids with flash points above 150 deg. F (65.6 deg. C), see subsection (2) of this section.

Note to (1)(a): The criteria for "safe for hot work" is located in the definition section, WAC 296-304-020(2).

(b) The certificate issued by the marine chemist or Coast Guard authorized person shall be posted in the immediate vicinity of the affected operations while they are in progress and kept on file for a period of at least three months from the date of the completion of the operation for which the certificate was generated.

(2) Hot work requiring testing by a competent person.

(a) Hot work is not permitted in or on the following spaces or adjacent spaces or other dangerous atmospheres until they have been tested by a competent person and determined to contain no concentrations of flammable vapors equal to or greater than 10 percent of the lower explosive limit:

- (i) Dry cargo holds;
- (ii) The bilges;

(iii) The engine room and boiler spaces for which a marine chemist or a Coast Guard authorized person certificate is not required under subsection (1)(a)(i) of this section; and

(iv) Vessels and vessel sections for which a marine chemist or Coast Guard authorized person certificate is not required under subsection (1)(a)(i) of this section; and

(v) Land-side confined and enclosed spaces or other dangerous atmospheres not covered by subsection (1)(a) of this section.

(b) If the concentration of flammable vapors or gases is equal to or greater than 10 percent of the lower explosive limit in the space or an adjacent space where the hot work is to be done, then the space shall be labeled "not safe for hot work" and ventilation shall be provided at volumes and flow rates sufficient to ensure that the concentration of flammable vapors or gases is below 10 percent by volume of the lower explosive limit. The warning label may be removed when the concentration of flammable vapors and gases are below 10 percent of the lower explosive limit.

Note to WAC 296-304-02007: See WAC 296-304-02013—Appendix A, for additional information relevant to performing hot work safely.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 95-22-015, § 296-304-02007, filed 10/20/95, effective 1/16/96. Statutory

Authority: Chapter 49.17 RCW. 95-04-006, § 296-304-02007, filed 1/18/95, effective 3/10/95; Order 76-7, § 296-304-02007, filed 3/1/76; Order 74-25, § 296-304-02007, filed 5/7/74.]

WAC 296-304-02009 Maintenance of safe conditions. (1) Preventing hazardous materials from entering. Pipelines that could carry hazardous materials into spaces that have been certified "safe for workers" or "safe for hot work" shall be disconnected, blanked off, or otherwise blocked by a positive method to prevent hazardous materials from being discharged into the space.

(2) Alteration of existing conditions. When a change that could alter conditions within a tested confined or enclosed space or other dangerous atmosphere occurs, work in the affected space or area shall be stopped. Work may not be resumed until the affected space or area is visually inspected and retested and found to comply with WAC 296-304-02003, 296-304-02005, and 296-304-02007, as applicable.

Note to (2): Examples of changes that would warrant the stoppage of work include: The opening of manholes or other closures or the adjusting of a valve regulating the flow of hazardous materials.

(3) Tests to maintain the conditions of a marine chemist's or Coast Guard authorized person's certificates. A competent person shall visually inspect and test each space certified as "safe for workers" or "safe for hot work," as often as necessary to ensure that atmospheric conditions within that space is maintained within the conditions established by the certificate after the certificate has been issued.

(4) Change in the conditions of a marine chemist's or Coast Guard authorized person's certificate. If a competent person finds that the atmospheric conditions within a certified space fail to meet the applicable requirements of WAC 296-304-02003, 296-304-02005, and 296-304-02007, work in the certified space shall be stopped and may not be resumed until the space has been retested by a marine chemist or Coast Guard authorized person and a new certificate issued in accordance with WAC 296-304-02007(1).

(5) Tests to maintain a competent person's findings. After a competent person has conducted a visual inspection and tests required in WAC 296-304-02003, 296-304-02005, and 296-304-02007 and determined a space to be safe for an employee to enter, he or she shall continue to test and visually inspect spaces as often as necessary to ensure that the required atmospheric conditions within the tested space are maintained.

(6) Changes in conditions determined by competent person's findings. After the competent person has determined initially that a space is safe for an employee to enter and he or she finds subsequently that the conditions within the tested space fail to meet the requirements of WAC 296-304-02003, 296-304-02005, and 296-304-02007, as applicable, work shall be stopped until the conditions in the tested space are corrected to comply with WAC 296-304-02003, 296-304-02005, and 296-304-02007, as applicable.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 95-22-015, § 296-304-02009, filed 10/20/95, effective 1/16/96. Statutory Authority: Chapter 49.17 RCW. 95-04-006, § 296-304-02009, filed

1/18/95, effective 3/10/95; Order 76-7, § 296-304-02009, filed 3/1/76; Order 74-25, § 296-304-02009, filed 5/7/74.]

WAC 296-304-02011 Warning signs and labels. (1) Employee comprehension of signs and labels. The employer shall ensure that each sign or label posted to comply with the requirements of this section is presented in a manner that can be perceived and understood by all employees.

(2) Posting of large work areas. A warning sign or label required by subsection (1) of this section need not be posted at an individual tank, compartment or work space within a work area if the entire work area has been tested and certified: "Not safe for workers," "not safe for hot work," and if the sign or label to this effect is posted conspicuously at each means of access to the work area.

[Statutory Authority: Chapter 49.17 RCW. 95-04-006, § 296-304-02011, filed 1/18/95, effective 3/10/95; Order 74-25, § 296-304-02011, filed 5/7/74.]

WAC 296-304-02013 Appendix A—Compliance assistance guidelines for confined and enclosed spaces and other dangerous atmospheres. This appendix is a nonmandatory set of guidelines provided to assist employers in complying with the requirements of WAC 296-304-020 through 296-304-02011. This appendix neither creates additional obligations nor detracts from obligations otherwise contained in this chapter. It is intended to provide explanatory information and educational material to employers and employees to foster understanding of, and compliance with, this chapter.

WAC 296-304-020 through 296-304-02011. These standards are minimum safety standards for entering and working safely in vessel tanks and compartments.

WAC 296-304-020(2) Definition of "Hot work." There are several instances in which circumstances do not necessitate that grinding, drilling, abrasive blasting be regarded as hot work. Some examples are:

(1) Abrasive blasting of the hull for paint preparation does not necessitate pumping and cleaning the tanks of a vessel.

(2) Prior to hot work on any hollow structure, the void space should be tested and appropriate precautions taken.

WAC 296-304-020(2) Definition of "Lower explosive limit." The terms lower flammable limit (LFL) and lower explosive limit (LEL) are used interchangeably in fire science literature.

WAC 296-304-020(2) Definition of "Upper explosive limit." The terms upper flammable limit (UFL) and upper explosive limit (UEL) are used interchangeably in fire science literature.

WAC 296-304-02003(1) After a tank has been properly washed and ventilated, the tank should contain 20.8 percent oxygen by volume. This is the same amount found in our normal atmosphere at sea level. However, it is possible that the oxygen content will be lower. When this is the case, the reasons for this deficiency should be determined and corrective action taken.

An oxygen content of 19.5 percent can support life and is adequate for entry. However, any oxygen level less than 20.8 percent and greater than 19.5 percent level should also alert the competent person to look for the causes of the oxygen deficiency and to correct them prior to entry.

WAC 296-304-02003(2) Flammable atmospheres. Atmospheres with a concentration of flammable vapors at or above 10 percent of the lower explosive limit (LEL) are considered hazardous when located in confined spaces. However, atmospheres with flammable vapors below 10 percent of the LEL are not necessarily safe.

Such atmospheres are too lean to burn. Nevertheless, when a space contains or produces measurable flammable vapors below the 10 percent LEL, it might indicate that flammable vapors are being released or introduced into the space and could present a hazard in time. Therefore, the cause of the vapors should be investigated and, if possible, eliminated prior to entry.

Some situations that have produced measurable concentrations of flammable vapors that could exceed 10 percent of the LEL in time are:

(1) Pipelines that should have been blanked or disconnected have opened, allowing product into the space.

(2) The vessel may have shifted, allowing product not previously cleaned and removed during washing to move into other areas of the vessel.

(3) Residues may be producing the atmosphere by releasing flammable vapor.

WAC 296-304-02003(2) Flammable atmospheres that are toxic. An atmosphere with a measurable concentration of a flammable substance below 10 percent of the LEL may be above the WISHA permissible exposure limit for that substance. In that case, refer to WAC 296-304-02003 (3)(b), (c), and (d).

WAC 296-304-02005 (2)(d), 296-304-02009(3), and 296-304-02009(5). The frequency with which a tank is monitored to determine if atmospheric conditions are being maintained is a function of several factors that are discussed below:

(1) Temperature. Higher temperatures will cause a combustible or flammable liquid to vaporize at a faster rate than lower temperatures. This is important since hotter days may cause tank residues to produce more vapors and that may result in the vapors exceeding 10 percent of the LEL or an overexposure to toxic contaminants.

(2) Work in the tank. Any activity in the tank could change the atmospheric conditions in that tank. Oxygen from a leaking oxyfuel hose or torch could result in an oxygen-enriched atmosphere that would more easily propagate a flame. Some welding operations use inert gas, and leaks can result in an oxygen-deficient atmosphere. Manual tank cleaning with high pressure spray devices can stir up residues and result in exposures to toxic contaminants. Simple cleaning or mucking out, where employees walk through and shovel residues and sludge, can create a change in atmospheric conditions.

(3) Period of time elapsed. If a period of time has elapsed since a marine chemist or Coast Guard authorized person has certified a tank as safe, the atmospheric condition should be rechecked by the competent person prior to entry and starting work.

(4) Unattended tanks or spaces. When a tank or space has been tested and declared safe, then subsequently left unattended for a period of time, it should be retested prior to entry and starting work. For example, when barges are left unattended at night, unidentified products from another barge are sometimes dumped into their empty tanks. Since this

would result in a changed atmosphere, the tanks should be retested prior to entry and starting work.

(5) Work break. When workers take a break or leave at the end of the shift, equipment sometimes is inadvertently left in the tanks. At lunch or work breaks and at the end of the shift are the times when it is most likely someone will leave a burning or cutting torch in the tank, perhaps turned on and leaking oxygen or an inert gas. Since the former can produce an oxygen-enriched atmosphere, and the latter an oxygen-deficient atmosphere, tanks should be checked for equipment left behind, and atmosphere, monitored if necessary prior to re-entering and resuming work. In an oxygen-enriched atmosphere, the flammable range is severely broadened. This means that an oxygen-enriched atmosphere can promote very rapid burning.

(6) Ballasting or trimming. Changing the position of the ballast, or trimming or in any way moving the vessel so as to expose cargo that had been previously trapped, can produce a change in the atmosphere of the tank. The atmosphere should be retested after any such move and prior to entry or work.

WAC 296-304-02007 (1) and (2) hot work. This is a reminder that other sections of the WISHA shipyard safety and health standards in chapter 296-304 WAC should be reviewed prior to starting any hot work. Most notably, WAC 296-304-040 through 296-304-04013, welding, cutting and heating, places additional restrictions on hot work: The requirements of WAC 296-304-04001 and 296-304-04005 must be met before hot work is begun on any metal that is toxic or is covered by a preservative coating respectively; the requirements of WAC 296-304-04007 must be met before welding, cutting, or heating is begun on any structural voids.

WAC 296-304-02003 (1)(b). During hot work, more than 20.8 percent oxygen by volume can be unsafe since it extends the normal flammable range. The standard permits the oxygen level to reach 22.0 percent by volume in order to account for instrument error. However, the cause of excess oxygen should be investigated and the source removed.

WAC 296-304-02011(2). If the entire vessel has been found to be in the same condition, then employers shall be considered to be in compliance with this requirement when signs using appropriate warning language in accordance with WAC 296-304-02011(1) are posted at the gangway and at all other means of access to the vessel.

[Statutory Authority: Chapter 49.17 RCW. 95-04-006, § 296-304-02013, filed 1/18/95, effective 3/10/95.]

WAC 296-304-02015 Appendix B—Confined and enclosed spaces and other dangerous atmospheres in shipyard employment. This appendix provides a complete reprint of U.S. Coast Guard regulations as of October 1, 1993 referenced in WAC 296-304-020 for purposes of determining who is a Coast Guard authorized person.

(1) Title 46 CFR 35.01-1 (a) through (c) covering hot work on tank vessels reads as follows:

(a) The provisions of "Standard for the Control of Gas Hazards on Vessels to be Repaired," NFPA No. 306, published by National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02269, shall be used as a guide in conducting the inspections and issuance of certificates required by this chapter.

(b) Until an inspection has been made to determine that such operation can be undertaken with safety, no alterations, repairs, or other such operations involving riveting, welding, burning, or like fire-producing actions shall be made:

(i) Within or on the boundaries of cargo tanks that have been used to carry flammable or combustible liquid or chemicals in bulk, or within spaces adjacent to such cargo tanks; or

(ii) Within or on the boundaries of fuel tanks; or

(iii) To pipe lines, heating coils, pumps, fittings, or other appurtenances connected to such cargo or fuel tanks.

(c) Such inspections shall be made and evidenced as follows:

(i) In ports or places in the United States or its territories and possessions, the inspection shall be made by a marine chemist certificated by the National Fire Protection Association; however, if the services of such certified marine chemists are not reasonably available, the Officer in Charge, Marine Inspection, upon the recommendation of the vessel owner and his/her contractor or their representative, shall select a person who, in the case of an individual vessel, shall be authorized to make such inspection.

(ii) If the inspection indicates that such operations can be undertaken with safety, a certificate setting forth the fact in writing and qualified as may be required, shall be issued by the certified marine chemist or the authorized person before the work is started.

(iii) Such qualifications shall include any requirements as may be deemed necessary to maintain, insofar as can reasonably be done, the safe conditions in the spaces certified, throughout the operation and shall include such additional tests and certifications as considered required.

(iv) Such qualifications and requirements shall include precautions necessary to eliminate or minimize hazards that may be present from protective coatings or residues from cargoes.

(2) Title 46 CFR 71.60(c)(1) covering hot work on passenger vessels reads as follows:

(a) The provisions of "Standard for the Control of Gas Hazards on Vessels to be Repaired," NFPA No. 306, published by National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02269, shall be used as a guide in conducting the inspections and issuance of certificates required by this chapter.

(b) Until an inspection has been made to determine that such operation can be undertaken with safety, no alterations, repairs, or other such operations involving riveting, welding, burning, or like fire-producing actions shall be made:

(i) Within or on the boundaries of cargo tanks which have been used to carry flammable or combustible liquid or chemicals in bulk, or within spaces adjacent to such cargo tanks; or

(ii) Within or on the boundaries of fuel tanks; or

(iii) To pipe lines, heating coils, pumps, fittings, or other appurtenances connected to such cargo or fuel tanks.

(c) Such inspections shall be made and evidenced as follows:

(i) In ports or places in the United States or its territories and possessions the inspection shall be made by a marine chemist certificated by the National Fire Protection Association; however, if the services of such certified marine chemist are not reasonably available, the Officer in Charge,

Marine Inspection, upon the recommendation of the vessel owner and his/her contractor or their representative, shall select a person who, in the case of an individual vessel, shall be authorized to make such inspection.

(ii) If the inspection indicated that such operations can be undertaken with safety, a certificate setting forth the fact in writing and qualified as may be required, shall be issued by the certified marine chemist or the authorized person before the work is started.

(iii) Such qualifications shall include any requirements as may be deemed necessary to maintain, insofar as can reasonably be done, the safe conditions in the spaces certified throughout the operation and shall include such additional tests and certifications as considered required.

(iv) Such qualifications and requirements shall include precautions necessary to eliminate or minimize hazards that may be present from protective coatings or residues from cargoes.

(3) Title 46 CFR 91.50-1(c)(1) covering hot work on cargo and miscellaneous vessels as follows:

(a) The provisions of "Standard for the Control of Gas Hazards on Vessels to be Repaired," NFPA No. 306, published by National Fire Protection Association, 1 Batterymarch Park, Quincy, MA 02269, shall be used as a guide in conducting the inspections and issuance of certificates required by this chapter.

(b) Until an inspection has been made to determine that such operation can be undertaken with safety, no alterations, repairs, or other such operations involving riveting, welding, burning, or like fire-producing actions shall be made:

(i) Within or on the boundaries of cargo tanks which have been used to carry flammable or combustible liquid or chemicals in bulk, or within spaces adjacent to such cargo tanks; or,

(ii) Within or on the boundaries of fuel tanks; or,

(iii) To pipe lines, heating coils, pumps, fittings, or other appurtenances connected to such cargo or fuel tanks.

(c) Such inspections shall be made and evidenced as follows:

(i) In ports or places in the United States or its territories and possessions the inspection shall be made by a marine chemist certificated by the National Fire Protection Association; however, if the services of such certified marine chemist are not reasonably available, the Officer in Charge, Marine Inspection, upon the recommendation of the vessel owner and his/her contractor or their representative, shall select a person who, in the case of an individual vessel, shall be authorized to make such inspection.

(ii) If the inspection indicated that such operations can be undertaken with safety, a certificate setting forth the fact in writing and qualified as may be required, shall be issued by the certified marine chemist or the authorized person before the work is started.

(iii) Such qualifications shall include any requirements as may be deemed necessary to maintain, insofar as can reasonably be done, the safe conditions in the spaces certified throughout the operation and shall include such additional tests and certifications as considered required.

(iv) Such qualifications and requirements shall include precautions necessary to eliminate or minimize hazards that may be present from protective coatings or residues from cargoes.

[Statutory Authority: Chapter 49.17 RCW. 95-04-006, § 296-304-02015, filed 1/18/95, effective 3/10/95.]

WAC 296-304-030 Surface preparation and preservation—Scope and application. All sections of this chapter which include WAC 296-304-030 in the section number apply to surface preparation and preservation and WAC 296-304-03001 to 296-304-03009 applies only to shipbuilding and ship repairing.

[Order 74-25, § 296-304-030, filed 5/7/74.]

WAC 296-304-03001 Toxic cleaning solvents. (1) When toxic solvents are used, the employer shall employ one or more of the following measures to safeguard the health of employees exposed to these solvents.

(a) The cleaning operation shall be completely enclosed to prevent the escape of vapor into the working space.

(b) Either natural ventilation or mechanical exhaust ventilation shall be used to remove the vapor at the source and to dilute the concentration of vapors in the working space to a concentration which is safe for the entire work period.

(c) Employees shall be protected against toxic vapors by suitable respiratory protective equipment in accordance with the requirements of chapter 296-62 WAC, Part E and, where necessary, against exposure of skin and eyes to contact with toxic solvents and their vapors by suitable clothing and equipment.

(2) The principles in the threshold limit values to which attention is directed in WAC 296-304-02005 and applicable sections in chapter 296-62 WAC will be used by the department of labor and industries in enforcement proceedings in defining a safe concentration of air contaminants.

(3) When flammable solvents are used, precautions shall be taken in accordance with the requirements of WAC 296-304-03009.

[Statutory Authority: Chapter 49.17 RCW. 95-04-006, § 296-304-03001, filed 1/18/95, effective 3/10/95; 93-19-142 (Order 93-04), § 296-304-03001, filed 9/22/93, effective 11/1/93; Order 76-7, § 296-304-03001, filed 3/1/76; Order 74-25, § 296-304-03001, filed 5/7/74.]

WAC 296-304-03003 Chemical paint and preservative removers. (1) Employees shall be protected against skin contact during the handling and application of chemical paint and preservative removers and shall be protected against eye injury by goggles or face shields in accordance with the requirements of WAC 296-304-09001 (1) and (2).

(2) When using flammable paint and preservative removers precautions shall be taken in accordance with the requirements of WAC 296-304-03009.

(3) When using chemical paint and preservative removers which contain volatile and toxic solvents, such as benzol, acetone and amyl acetate, the provisions of WAC 296-304-03001 shall be applicable.

(4) When using paint and rust removers containing strong acids or alkalis, employees shall be protected by suitable face shields to prevent chemical burns on the face and neck.

(5) When steam guns are used, all employees working within range of the blast shall be protected by suitable face

shields. Metal parts of the steam gun itself shall be insulated to protect the operator against heat burns.

[Order 74-25, § 296-304-03003, filed 5/7/74.]

WAC 296-304-03005 Mechanical paint removers.

(1) Power tools.

(a) Employees engaged in the removal of paints, preservatives, rusts or other coatings by means of power tools shall be protected against eye injury by goggles or face shields in accordance with the requirements of WAC 296-304-09001(1).

(b) All portable rotating tools used for the removal of paints, preservatives, rusts or other coatings shall be adequately guarded to protect both the operator and nearby workers from flying missiles.

(c) Portable electric tools shall be grounded in accordance with the requirements of WAC 296-304-08003 (1) and (2).

(d) In a confined space, mechanical exhaust ventilation sufficient to keep the dust concentration to a minimum shall be used, or employees shall be protected by respiratory protective equipment in accordance with the requirements of chapter 296-62 WAC, Part E.

(2) Flame removal.

(a) Hardened preservative coatings shall not be removed by flame in enclosed spaces unless the employees exposed to fumes are protected by air line respirators in accordance with the requirements of chapter 296-62 WAC, Part E. Employees performing such an operation in the open air, and those exposed to the resulting fumes, shall be protected by a fume filter type respirator in accordance with requirements of chapter 296-62 WAC, Part E.

(b) Flame or heat shall not be used to remove soft and greasy preservative coatings.

(3) Abrasive blasting.

(a) Equipment. Hoses and fittings used for abrasive blasting shall meet the following requirements:

(i) Hoses. Hose of a type to prevent shocks from static electricity shall be used.

(ii) Hose couplings. Hose lengths shall be joined by metal couplings secured to the outside of the hose to avoid erosion and weakening of the couplings.

(iii) Nozzles. Nozzles shall be attached to the hose by fittings that will prevent the nozzle from unintentionally becoming disengaged. Nozzle attachments shall be of metal and shall fit onto the hose externally.

(iv) Dead man control. A dead man control device shall be provided at the nozzle end of the blasting hose either to provide direct cutoff or to signal the pot tender by means of a visual and audible signal to cut off the flow, in the event the blaster loses control of the hose. The pot tender shall be available at all times to respond immediately to the signal.

(b) Replacement. Hoses and all fittings used for abrasive blasting shall be inspected frequently to insure timely replacement before an unsafe amount of wear has occurred.

(c) Personal protective equipment.

(i) Abrasive blasters working in enclosed spaces shall be protected by hoods and air fed respirators or by air helmets of a positive pressure type in accordance with the requirements of chapter 296-62 WAC, Part E.

(ii) Abrasive blasters working in the open shall be protected as indicated in (1) except that when synthetic abrasives containing less than one percent free silica are used filter type respirators approved by the Bureau of Mines for exposure to lead dusts may be used in accordance with chapter 296-62 WAC, Part E.

(iii) Employees, other than blasters, including machine tenders and abrasive recovery men, working in areas where unsafe concentrations of abrasive materials and dusts are present shall be protected by eye and respiratory protective equipment in accordance with the requirements of WAC 296-304-09001 (1) and (2) and chapter 296-62, Part E, respectively.

(iv) The blaster shall be protected against injury from exposure to the blast by appropriate protective clothing, including gloves.

(v) Since surges from drops in pressure in the hose line can be of sufficient proportions to throw the blaster off the staging, the blaster shall be protected by a safety belt and life line tied off to the ship or other structure when blasting is being done from elevations where adequate protection against falling cannot be provided by railings.

[Statutory Authority: Chapter 49.17 RCW. 95-04-006, § 296-304-03005, filed 1/18/95, effective 3/10/95; 93-19-142 (Order 93-04), § 296-304-03005, filed 9/22/93, effective 11/1/93; Order 76-7, § 296-304-03005, filed 3/1/76; Order 74-25, § 296-304-03005, filed 5/7/74.]

WAC 296-304-03007 Painting. (1) Paints mixed with toxic vehicles or solvents.

(a) When paints mixed with toxic vehicles or solvents are sprayed, the following conditions shall apply:

(i) In confined spaces, employees continuously exposed to such spraying shall be protected by air line respirators in accordance with the requirements of chapter 296-62 WAC, Part E.

(ii) In tanks or compartments, employees continuously exposed to such spraying shall be protected by air line respirators in accordance with the requirements of chapter 296-62 WAC, Part E. Where mechanical ventilation is provided, employees shall be protected by respirators in accordance with the requirements of chapter 296-62 WAC, Part E.

(iii) In large and well ventilated areas, employees exposed to such spraying shall be protected by respirators in accordance with the requirements of chapter 296-62 WAC, Part E.

(b) Where brush application of paints with toxic solvents is done in confined spaces, or other areas where lack of ventilation creates a hazard, employees shall be protected by filter respirators in accordance with the requirements of chapter 296-62 WAC, Part E.

(c) When flammable paints or vehicles are used, precautions shall be taken in accordance with the requirements of WAC 296-304-03009.

(d) The metallic parts of air moving devices, including fans, blowers, and jet-type air movers, and all duct work shall be electrically bonded to the vessel's structure.

(2) Paints and tank coatings dissolved in highly volatile, toxic and flammable solvents. Several organic coatings, adhesives and resins are dissolved in highly toxic, flammable and explosive solvents with flash points below 80°F. Work

involving such materials shall be done only when all of the following special precautions have been taken:

(a) Sufficient exhaust ventilation shall be provided to keep the concentration of solvent vapors below ten percent of the lower explosive limit. Frequent tests shall be made by a competent person to ascertain the concentration.

(b) If the ventilation fails or if the concentration of solvent vapors rises above ten percent of the lower explosive limit, painting shall be stopped and the compartment shall be evacuated until the concentration again falls below ten percent of the lower explosive limit. If the concentration does not fall when painting is stopped, additional ventilation to bring the concentration down to ten percent of the lower explosive limit shall be provided.

(c) Ventilation shall be continued after the completion of painting until the space or compartment is gas free. The final determination as to whether the space or compartment is gas free shall be made after the ventilating equipment has been shut off for a least ten minutes.

(d) Exhaust ducts shall discharge clear of working areas and away from sources of possible ignition. Periodic tests shall be made to ensure that the exhausted vapors are not accumulating in other areas within or around the vessel or dry dock.

(e) All motors and control equipment shall be of the explosion-proof type. Fans shall have nonferrous blades. Portable air ducts shall also be of nonferrous materials. All motors and associated control equipment shall be properly maintained and grounded.

(f) Only nonsparking paint buckets, spray guns and tools shall be used. Metal parts of paint brushes and rollers shall be insulated. Staging shall be erected in a manner which ensures that it is nonsparking.

(g) Only explosion proof lights, approved by the Underwriters' Laboratories for use in Class I, Group D atmospheres, or approved as permissible by the U.S. Bureau of Mines or the U.S. Coast Guard, shall be used.

(h) A competent person shall inspect all power and lighting cables to ensure that the insulation is in excellent condition, free of all cracks and worn spots, that there are no connections within fifty feet of the operation, that lines are not overloaded, and that they are suspended with sufficient slack to prevent undue stress or chafing.

(i) The face, eyes, head, hands and all other exposed parts of the bodies of employees handling such highly volatile paints shall be protected. All footwear shall be nonsparking, such as rubbers, rubber boots or rubber soled shoes without nails. Coveralls or other outer clothing shall be of cotton. Rubber, rather than plastic gloves shall be used because of the danger of static sparks.

(j) No matches, lighted cigarettes, cigars, or pipes, and no cigarette lighters or ferrous articles shall be taken into the area where work is being done.

(k) All solvent drums taken into the compartment shall be placed on nonferrous surfaces and shall be grounded to the vessel. Metallic contact shall be maintained between containers and drums when materials are being transferred from one to another.

(l) Spray guns, paint pots, and metallic parts of connecting tubing shall be electrically bonded, and the bonded assembly shall be grounded to the vessel.

(m) All employees continuously in a compartment in which such painting is being performed, shall be protected by air line respirators in accordance with the requirements of chapter 296-62 WAC, Part E and by suitable protective clothing. Employees entering such compartments for a limited time shall be protected by filter cartridge type respirators in accordance with the requirements of chapter 296-62 WAC, Part E.

(n) All employees doing exterior paint spraying with such paints shall be protected by suitable filter cartridge type respirators in accordance with the requirements of chapter 296-62 WAC, Part E and by suitable protective clothing.

[Statutory Authority: Chapter 49.17 RCW. 95-04-006, § 296-304-03007, filed 1/18/95, effective 3/10/95; 93-19-142 (Order 93-04), § 296-304-03007, filed 9/22/93, effective 11/1/93; Order 76-7, § 296-304-03007, filed 3/1/76; Order 74-25, § 296-304-03007, filed 5/7/74.]

WAC 296-304-03009 Flammable liquids. (1) In all cases when liquid solvents, paint and preservative removers, paints or vehicles, other than those covered by WAC 296-304-03007(2), are capable of producing a flammable atmosphere under the conditions of use the following precautions shall be taken:

(a) Smoking, open flames, arcs and spark-producing equipment shall be prohibited in the area.

(b) Ventilation shall be provided in sufficient quantities to keep the concentration of vapors below ten percent of their lower explosive limit. Frequent tests shall be made by a competent person to ascertain the concentration.

(c) Scrapings and rags soaked with these materials shall be kept in a covered metal container.

(d) Only explosion proof lights, approved by the Underwriters' Laboratories for use in Class I, Group D atmospheres, or approved as permissible by the U.S. Bureau of Mines or the U.S. Coast Guard, shall be used.

(e) A competent person shall inspect all power and lighting cables to ensure that the insulation is in excellent condition, free of all cracks and worn spots, that there are no connections within fifty feet of the operation, that lines are not overloaded, and that they are suspended with sufficient slack to prevent undue stress or chafing.

(f) Suitable fire extinguishing equipment shall be immediately available in the work area and shall be maintained in a state of readiness for instant use.

[Order 74-25, § 296-304-03009, filed 5/7/74.]

WAC 296-304-040 Welding, cutting and heating—Scope and application. All sections of this chapter which include WAC 296-304-040 in the section number apply to welding, cutting and heating.

[Order 74-25, § 296-304-040, filed 5/7/74.]

WAC 296-304-04001 Ventilation and protection in welding, cutting and heating. (1) Mechanical ventilation requirements.

(a) For the purposes of this section, mechanical ventilation shall meet the following requirements:

(i) Mechanical ventilation shall consist of either general mechanical ventilation systems or local exhaust systems.

(ii) General mechanical ventilation shall be of sufficient capacity and so arranged as to produce the number of air

changes necessary to maintain welding fumes and smoke within safe limits.

(iii) Local exhaust ventilation shall consist of freely movable hoods intended to be placed by the welder or burner as close as practicable to the work. This system shall be of sufficient capacity and so arranged as to remove fumes and smoke at the source and keep the concentration of them in the breathing zone within safe limits.

(iv) Contaminated air exhausted from a working space shall be discharged into the open air or otherwise clear of the source of intake air.

(v) All air replacing that withdrawn shall be clean and respirable.

(vi) Oxygen shall not be used for ventilation purposes, comfort cooling, blowing dust or dirt from clothing, or for cleaning the work area.

(2) Welding, cutting and heating in confined spaces.

(a) Except as provided in WAC 296-304-04001 (2)(c) and (3)(b), either general mechanical or local exhaust ventilation meeting the requirements of (1) of this section shall be provided whenever welding, cutting or heating is performed in a confined space.

(b) The means of access shall be provided to a confined space and ventilation ducts to this space shall be arranged in accordance with WAC 296-304-05011 (2)(a) and (b).

(c) When sufficient ventilation cannot be obtained without blocking the means of access, employees in the confined space shall be protected by air line respirators in accordance with the requirements of chapter 296-62 WAC, Part E, and an employee on the outside of such a confined space shall be assigned to maintain communication with those working within it and to aid them in an emergency.

(3) Welding, cutting or heating of metals of toxic significance.

(a) Welding, cutting or heating in any enclosed spaces aboard the vessel involving the metals specified in this subsection shall be performed with either general mechanical or local exhaust ventilation meeting the requirements of (1) of this section.

(i) Zinc-bearing base or filler metals or metals coated with zinc-bearing materials.

(ii) Lead base metals.

(iii) Cadmium-bearing filler materials.

(iv) Chromium-bearing metals or metals coated with chromium-bearing materials.

(b) Welding, cutting, or heating in any enclosed spaces aboard the vessel involving the metals specified in this subsection shall be performed with local exhaust ventilation in accordance with the requirements of (1) of this section or employees shall be protected by air line respirators in accordance with the requirements of chapter 296-62 WAC, Part E.

(i) Metals containing lead, other than as an impurity, or metals coated with lead-bearing materials.

(ii) Cadmium-bearing or cadmium coated base metals.

(iii) Metals coated with mercury-bearing metals.

(iv) Beryllium-containing base or filler metals. Because of its high toxicity, work involving beryllium shall be done with both local exhaust ventilation and air line respirators.

(c) Employees performing such operations in the open air shall be protected by filter type respirators in accordance with the requirements of WAC 296-304-09003, except that

employees performing such operations on beryllium-containing base or filler metals shall be protected by air line respirators in accordance with the requirements of chapter 296-62 WAC, Part E.

(d) Other employees exposed to the same atmosphere as the welders or burners shall be protected in the same manner as the welder or burner.

(4) Inert-gas metal-arc welding.

(a) Since the inert-gas metal-arc welding process involves the production of ultraviolet radiation of intensities of 5 to 30 times that produced during shielded metal-arc welding, the decomposition of chlorinated solvents by ultraviolet rays, and the liberation of toxic fumes and gases, employees shall not be permitted to engage in, or be exposed to the process until the following special precautions have been taken:

(i) The use of chlorinated solvents shall be kept at least two hundred feet from the exposed arc, and surfaces prepared with chlorinated solvents shall be thoroughly dry before welding is permitted on such surfaces.

(ii) Helpers and other employees in the area not protected from the arc by screening as provided in WAC 206-304-04011(5) shall be protected by filter lenses meeting the requirements of WAC 296-304-09001 (1) and (3). When two or more welders are exposed to each other's arc, filter lens goggles of a suitable type meeting the requirements of WAC 296-304-09001 (1) and (3) shall be worn under welding helmets or hand shields to protect the welder against flashes and radiant energy when either the helmet is lifted or the shield is removed.

(iii) Welders and other employees who are exposed to radiation shall be suitably protected so that the skin is covered completely to prevent burns and other damage by ultraviolet rays. Welding helmets and hand shields shall be free of leaks and openings, and free of highly reflective surfaces.

(iv) When inert-gas metal-arc welding is being performed on stainless steel, the requirements of (3)(b) of this section shall be met to protect against dangerous concentrations of nitrogen dioxide.

(5) General welding, cutting and heating.

(a) Welding, cutting and heating not involving conditions or materials described in (2), (3) or (4) of this section may normally be done without mechanical ventilation or respiratory protective equipment, but where, because of unusual physical or atmospheric conditions, an unsafe accumulation of contaminants exists, suitable mechanical ventilation or respiratory protective equipment shall be provided.

(b) Employees performing any type of welding, cutting or heating shall be protected by suitable eye protective equipment in accordance with the requirements of WAC 296-304-09001 (1) and (3).

(6) Residues and cargos of metallic ores.

(a) Residues and cargos of metallic ores of toxic significance shall be removed from the area or protected from the heat before welding, cutting or heating is begun.

[Statutory Authority: Chapter 49.17 RCW. 95-04-006, § 296-304-04001, filed 1/18/95, effective 3/10/95; 93-19-142 (Order 93-04), § 296-304-04001, filed 9/22/93, effective 11/1/93; Order 74-25, § 296-304-04001, filed 5/7/74.]

WAC 296-304-04003 Fire prevention. (1) When hot work is performed below decks or in other situations in which accidental fire would jeopardize the safety of employees, the following precautions shall be taken.

(2) When practical, objects to be welded, cut or heated shall be moved to a designated safe location or, if the object to be welded, cut or heated cannot be readily moved, all movable fire hazards including residues of combustible bulk cargos in the vicinity shall be taken to a safe place.

(3) If the object to be welded, cut or heated cannot be moved and if all the fire hazards including combustible cargos cannot be removed, positive means shall be taken to confine the heat, sparks, and slag, and to protect the immovable fire hazards from them.

(4) No welding, cutting or heating shall be done where the application of flammable paints or the presence of other flammable compounds or of heavy dust concentrations creates a hazard.

(5) Suitable fire extinguishing equipment shall be immediately available in the work area and shall be maintained in a state of readiness for instant use. In addition, when hot work is being performed aboard a vessel and pressure is not available on the vessel's fire system, an auxiliary supply of water shall be made available where practicable, consistent with avoiding freezing of the lines or hose.

(6) When the welding, cutting, or heating operation is such that normal fire prevention precautions are not sufficient, additional personnel shall be assigned to guard against fire while the actual welding, cutting, or heating operation is being performed and for a sufficient period of time after completion of the work to insure that no possibility of fire exists. Such personnel shall be instructed as to the specific anticipated fire hazards and how the fire fighting equipment provided is to be used.

(7) When welding, cutting or heating is performed on tank shells, decks, overheads and bulkheads, since direct penetration of sparks or heat transfer may introduce a fire hazard to an adjacent compartment, the same precautions shall be taken on the opposite side as are taken on the side on which the welding is being performed.

(8) In order to eliminate the possibility of fire in enclosed spaces as a result of gas escaping through leaking or improperly closed torch valves, the gas supply to the torch shall be positively shut off at some point outside the enclosed space whenever the torch is not to be used or whenever the torch is left unattended for a substantial period of time, such as during the lunch hour. Overnight and at the change of shifts the torch and hose shall be removed from the confined space. Open end fuel gas and oxygen hoses shall be immediately removed from enclosed spaces when they are disconnected from the torch or other gas consuming device.

(9) Vaporizing liquid extinguishers shall not be used in enclosed spaces.

(10) Except when the contents are being removed or transferred, drums, pails, and other containers which contain or have contained flammable liquids shall be kept closed. Empty containers shall be removed to a safe area apart from hot work operations, or open flames.

[Order 76-7, § 296-304-04003, filed 3/1/76; Order 74-25, § 296-304-04003, filed 5/7/74.]

WAC 296-304-04005 Welding, cutting and heating in way of preservative coatings. (1) Before welding, cutting or heating is commenced on any surface covered by a preservative coating whose flammability is not known, a test shall be made by a competent person to determine its flammability. Preservative coatings shall be considered to be highly flammable when scrapings burn with extreme rapidity.

(2) Precautions shall be taken to prevent ignition of highly flammable hardened preservative coatings. When coatings are determined to be highly flammable they shall be stripped from the area to be heated to prevent ignition. A 1 1/2-inch or larger fire hose with fog nozzle, which has been uncoiled and placed under pressure, shall be immediately available for instant use in the immediate vicinity, consistent with avoiding freezing of the hose.

(3) Protection against toxic preservative coatings.

(a) In enclosed spaces all surfaces covered with toxic preservatives shall be stripped of all toxic coatings for a distance of at least 4 inches from the area of heat application or the employees shall be protected by air line respirators meeting the requirements of chapter 296-62 WAC, Part E.

(b) In the open air employees shall be protected by a filter type respirator in accordance with the requirements of chapter 296-62 WAC, Part E.

(4) Before welding, cutting or heating is commenced in enclosed spaces on metals covered by soft and greasy preservatives, the following precautions shall be taken:

(a) A competent person shall test the atmosphere in the space to ensure that it does not contain explosive vapors, since there is a possibility that some soft and greasy preservatives may have flash points below temperatures which may be expected to occur naturally. If such vapors are determined to be present, no hot work shall be commenced until such precautions have been taken as will ensure that the welding, cutting or heating can be performed in safety.

(b) The preservative coatings shall be removed for a sufficient distance from the area to be heated to ensure that the temperature of the unstripped metal will not be appreciably raised. Artificial cooling of the metal surrounding the heated area may be used to limit the size of the area required to be cleaned. The prohibition contained in WAC 296-304-03005 (2)(b) shall apply.

(5) Immediately after welding, cutting or heating is commenced in enclosed spaces on metal covered by soft and greasy preservatives, and at frequent intervals thereafter, a competent person shall make tests to ensure that no flammable vapors are being produced by the coatings. If such vapors are determined to be present, the operation shall be stopped immediately and shall not be resumed until such additional precautions have been taken as are necessary to ensure that the operation can be resumed safely.

[Statutory Authority: Chapter 49.17 RCW. 95-04-006, § 296-304-04005, filed 1/18/95, effective 3/10/95; 93-19-142 (Order 93-04), § 296-304-04005, filed 9/22/93, effective 11/1/93; Order 74-25, § 296-304-04005, filed 5/7/74.]

WAC 296-304-04007 Welding, cutting and heating of hollow metal containers and structures not covered by WAC 296-304-02003. (1) Drums, containers, or hollow structures which have contained toxic or flammable substances shall, before welding, cutting, or heating is undertaken

on them, either be filled with water or thoroughly cleaned of such substances and ventilated and tested.

(2) Before heat is applied to a drum, container, or hollow structure, a vent or opening shall be provided for the release of any built-up pressure during the application of heat.

(3) Before welding, cutting, heating or brazing is begun on structural voids such as skegs, bilge keels, fair waters, masts, booms, support stanchions, pipe stanchions or railings, a competent person shall inspect the object and, if necessary, test it for the presence of flammable liquids or vapors. If flammable liquids or vapors are present, the object shall be made safe.

(4) Objects such as those listed in (3) of this section shall also be inspected to determine whether water or other nonflammable liquids are present which, when heated, would build up excessive pressure. If such liquids are determined to be present, the object shall be vented, cooled, or otherwise made safe during the application of heat.

(5) Jacketed vessels shall be vented before and during welding, cutting or heating operations in order to release any pressure which may build up during the application of heat.

[Order 76-7, § 296-304-04007, filed 3/1/76; Order 74-25, § 296-304-04007, filed 5/7/74.]

WAC 296-304-04009 Gas welding and cutting. (1) Transporting, moving and storing compressed gas cylinders.

(a) Valve protection caps shall be in place and secure. Oil shall not be used to lubricate protection caps.

(b) When cylinders are hoisted, they shall be secured on a cradle, slingboard or pallet. They shall not be hoisted by means of magnets or choker slings.

(c) Cylinders shall be moved by tilting and rolling them on their bottom edges. They shall not be intentionally dropped, struck, or permitted to strike each other violently.

(d) When cylinders are transported by vehicle, they shall be secured in position.

(e) Valve protection caps shall not be used for lifting cylinders from one vertical position to another. Bars shall not be used under valves or valve protection caps to pry cylinders loose when frozen. Warm, not boiling, water shall be used to thaw cylinders loose.

(f) Unless cylinders are firmly secured on a special carrier intended for this purpose, regulators shall be removed and valve protection caps put in place before cylinders are moved.

(g) A suitable cylinder truck, chain, or other steadying device shall be used to keep cylinders from being knocked over while in use.

(h) When work is finished, when cylinders are empty or when cylinders are moved at any time, the cylinder valves shall be closed.

(i) Acetylene cylinders shall be secured in an upright position at all times except, if necessary, for short periods of time while cylinders are actually being hoisted or carried.

(2) Placing cylinders.

(a) Cylinders shall be kept far enough away from the actual welding or cutting operation so that sparks, hot slag or flame will not reach them. When this is impractical, fire resistant shields shall be provided.

(b) Cylinders shall be placed where they cannot become part of an electrical circuit. Electrodes shall not be struck against a cylinder to strike an arc.

(c) Fuel gas cylinders shall be placed with valve end up whenever they are in use. They shall not be placed in a location where they would be subject to open flame, hot metal, or other sources of artificial heat.

(d) Cylinders containing oxygen or acetylene or other fuel gas shall not be taken into confined spaces.

(3) Treatment of cylinders.

(a) Cylinders, whether full or empty, shall not be used as rollers or supports.

(b) No person other than the gas supplier shall attempt to mix gases in a cylinder. No one except the owner of the cylinder or person authorized by him shall refill a cylinder. No one shall use a cylinder's contents for purposes other than those intended by the supplier. Only cylinders bearing Interstate Commerce Commission identification and inspection markings shall be used.

(c) No damaged or defective cylinder shall be used.

(4) Use of fuel gas. The employer shall thoroughly instruct employees in the safe use of fuel gas, as follows:

(a) Before connecting a regulator to a cylinder valve, the valve shall be opened slightly and closed immediately. (This action is generally termed "cracking" and is intended to clear the valve of dust or dirt that might otherwise enter the regulator.) The person cracking the valve shall stand to one side of the outlet, not in front of it. The valve of a fuel gas cylinder shall not be cracked where the gas would reach welding work, sparks, flame or other possible sources of ignition.

(b) The cylinder valve shall always be opened slowly to prevent damage to the regulator. To permit quick closing, valves on fuel gas cylinders shall not be opened more than 1 1/2 turns. When a special wrench is required, it shall be left in position on the stem of the valve while the cylinder is in use so that the fuel gas flow can be shut off quickly in case of emergency. In the case of a manifolded or coupled cylinders, at least one such wrench shall always be available for immediate use. Nothing shall be placed on top of a fuel gas cylinder, when in use, which may damage the safety device or interfere with the quick closing of the valve.

(c) Fuel gas shall not be used from cylinders through torches or other devices which are equipped with shut-off valves without reducing the pressure through a suitable regulator attached to the cylinder valve or manifold.

(d) Before a regulator is removed from a cylinder valve, the cylinder valve shall always be closed and the gas released from the regulator.

(e) If, when the valve on a fuel gas cylinder is opened, there is found to be a leak around the valve stem, the valve shall be closed and the gland nut tightened. If this action does not stop the leak, the use of the cylinder shall be discontinued, and it shall be properly tagged and removed from the vessel. In the event that fuel gas should leak from the cylinder valve rather than from the valve stem and the gas cannot be shut off, the cylinder shall be properly tagged and removed from the vessel. If a regulator attached to a cylinder valve will effectively stop a leak through the valve seat the cylinder need not be removed from the vessel.

(f) If a leak should develop at a fuse plug or other safety device, the cylinder shall be removed from the vessel.

(5) Fuel gas and oxygen manifolds.

(a) Fuel gas and oxygen manifolds shall bear the name of the substance they contain in letters at least one (1) inch high which shall be either painted on the manifold or on a sign permanently attached to it.

(b) Fuel gas and oxygen manifolds shall be placed in safe and accessible locations in the open air. They shall not be located within enclosed spaces.

(c) Manifold hose connections, including both ends of the supply hose that lead to the manifold, shall be such that the hose cannot be interchanged between fuel gas and oxygen manifolds and supply header connections. Adapters shall not be used to permit the interchange of hose. Hose connections shall be kept free of grease and oil.

(d) When not in use, manifold and header hose connections shall be capped.

(e) Nothing shall be placed on top of a manifold, when in use, which will damage the manifold or interfere with the quick closing of the valves.

(6) Hose.

(a) Fuel gas hose and oxygen hose shall be easily distinguishable from each other. The contrast may be made by different colors or by surface characteristics readily distinguishable by the sense of touch. Oxygen and fuel gas hoses shall not be interchangeable. A single hose having more than one gas passage, a wall failure of which would permit the flow of one gas into the other gas passage, shall not be used.

(b) When parallel sections of oxygen and fuel gas hose are taped together, not more than 4 inches out of 8 inches shall be covered by tape.

(c) All hose carrying acetylene, oxygen, natural or manufactured fuel gas, or any gas or substance which may ignite or enter into combustion or be in any way harmful to employees, shall be inspected at the beginning of each shift. Defective hose shall be removed from service.

(d) Hose which has been subjected to flashback or which shows evidence of severe wear or damage shall be tested to twice the normal pressure to which it is subject, but in no case less than two hundred psi. Defective hose or hose in doubtful condition shall not be used.

(e) Hose couplings shall be of the type that cannot be unlocked or disconnected by means of a straight pull without rotary motion.

(f) Boxes used for the stowage of gas hose shall be ventilated.

(7) Torches.

(a) Clogged torch tip openings shall be cleaned with suitable cleaning wires, drills or other devices designed for such purpose.

(b) Torches shall be inspected at the beginning of each shift for leaking shutoff valves, hose couplings, and tip connections. Defective torches shall not be used.

(c) Torches shall be lighted by friction lighters or other approved devices, and not by matches or from hot work.

(8) Pressure regulators. Oxygen and fuel gas pressure regulators including their related gauges shall be in proper working order while in use.

[Order 74-25, § 296-304-04009, filed 5/7/74.]

WAC 296-304-04011 Arc welding and cutting. (1)
Manual electrode holders.

(a) Only manual electrode holders which are specifically designed for arc welding and cutting and are of a capacity capable of safely handling the maximum rated current required by the electrodes shall be used.

(b) Any current carrying parts passing through the portion of the holder which the arc welder or cutter grips in his hand, and the outer surfaces of the jaws of the holder, shall be fully insulated against the maximum voltage encountered to ground.

(2) Welding cables and connectors.

(a) All arc welding and cutting cables shall be of the completely insulated, flexible type, capable of handling the maximum current requirements of the work in progress, taking into account the duty cycle under which the arc welder or cutter is working.

(b) Only cable free from repair or splices for a minimum distance of ten feet from the cable end to which the electrode holder is connected shall be used, except that cables with standard insulated connectors or with splices whose insulating quality is equal to that of the cable are permitted.

(c) When it becomes necessary to connect or splice lengths of cable one to another, substantial insulated connectors of a capacity at least equivalent to that of the cable shall be used. If connections are effected by means of cable lugs, they shall be securely fastened together to give good electrical contact, and the exposed metal parts of the lugs shall be completely insulated.

(d) Cables in poor repair shall not be used. When a cable, other than the cable lead referred to in (b), becomes worn to the extent of exposing bare conductors, the portion thus exposed shall be protected by means of rubber and friction tapes or other equivalent insulation.

(3) Ground returns and machine grounding.

(a) A ground return cable shall have a safe current carrying capacity equal to or exceeding the specified maximum output capacity of the arc welding or cutting unit which it services. When a single ground return cable services more than one unit, its safe current carrying capacity shall equal or exceed the total specified maximum output capacities of all the units which it services.

(b) Structures or pipe lines, except pipelines containing gases or flammable liquids or conduits containing electrical circuits, may be used as part of the ground return circuit, provided that the pipe or structure has a current carrying capacity equal to that required by (2).

(c) When a structure or pipe line is employed as a ground return circuit, it shall be determined that the required electrical contact exists at all joints. The generation of an arc, sparks or heat at any point shall cause rejection of the structure as a ground circuit.

(d) When a structure or pipe line is continuously employed as a ground return circuit, all joints shall be bonded, and periodic inspections shall be conducted to ensure that no condition of electrolysis or fire hazard exists by virtue of such use.

(e) The frames of all arc welding and cutting machines shall be grounded either through a third wire in the cable containing the circuit conductor or through a separate wire which is grounded at the source of the current. Grounding

circuits, other than by means of the vessel's structure, shall be checked to ensure that the circuit between the ground and the grounded power conductor has resistance low enough to permit sufficient current to flow to cause the fuse or circuit breaker to interrupt the current.

(f) All ground connections shall be inspected to ensure that they are mechanically strong and electrically adequate for the required current.

(4) Operating instructions. Employers shall instruct employees in the safe means of arc welding and cutting as follows:

(a) When electrode holders are to be left unattended, the electrodes shall be removed and the holders shall be so placed or protected that they cannot make electrical contact with employees or conducting objects.

(b) Hot electrode holders shall not be dipped in water, since to do so may expose the arc welder or cutter to electric shock.

(c) When the arc welder or cutter has occasion to leave his work or to stop work for any appreciable length of time, or when the arc welding or cutting machine is to be moved, the power supply switch to the equipment shall be opened.

(d) Any faulty or defective equipment shall be reported to the supervisor.

(5) Shielding. Whenever practicable, all arc welding and cutting operations shall be shielded by noncombustible or flame-proof screens which will protect employees and other persons working in the vicinity from the direct rays of the arc.

[Order 74-25, § 296-304-04011, filed 5/7/74.]

WAC 296-304-04013 Uses of fissionable material in ship-breaking, shipbuilding and ship repairing. (1) In ship-breaking, shipbuilding and ship repairing and related activities involving the use of and exposure to sources of ionizing radiation not only on conventionally powered but also on nuclear powered vessels, the applicable provisions of the Atomic Energy Commission's Standards for Protection Against Radiation (10 CFR Part 20), relating to protection against occupational radiation exposure, shall apply.

(2) Any activity which involves the use of radioactive material, whether or not under license from the Atomic Energy Commission, shall be performed by competent persons specially trained in the proper and safe operation of such equipment. In the case of materials used under commission license, only persons actually licensed, or competent persons under direction and supervision of the licensee, shall perform such work.

[Order 76-7, § 296-304-04013, filed 3/1/76; Order 74-25, § 296-304-04013, filed 5/7/74.]

WAC 296-304-050 Scaffolds, ladders and other working surfaces—Scope and application. All sections of this chapter which include WAC 296-304-050 in the section number apply to scaffolds, ladders and other working surfaces.

[Order 74-25, § 296-304-050, filed 5/7/74.]

WAC 296-304-05001 Scaffolds or staging. (1)
General requirements.

(a) All scaffolds and their supports whether of lumber, steel or other material, shall be capable of supporting the load they are designed to carry with a safety factor of not less than four.

(b) All lumber used in the construction of scaffolds shall be spruce, fir, long leaf yellow pine, Oregon pine or wood of equal strength. The use of hemlock, short leaf yellow pine, or short fiber lumber is prohibited.

(c) Lumber dimensions as given are nominal except where given in fractions of an inch.

(d) All lumber used in the construction of scaffolds shall be sound, straight-grained, free from cross grain, shakes and large, loose or dead knots. It shall also be free from dry rot, large checks, worm holes or other defects which impair its strength or durability.

(e) Scaffolds shall be maintained in a safe and secure condition. Any component of the scaffold which is broken, burned or otherwise defective shall be replaced.

(f) Barrels, boxes, cans, loose bricks, or other unstable objects shall not be used as working platforms or for the support of planking intended as scaffolds or working platforms.

(g) No scaffold shall be erected, moved, dismantled or altered except under the supervision of competent persons.

(h) No welding, burning, riveting or open flame work shall be performed on any staging suspended by means of fiber rope.

(i) Lifting bridles on working platforms suspended from cranes shall consist of four legs so attached that the stability of the platform is assured.

(j) Unless the crane hook has a safety latch or is moused, the lifting bridles on working platforms suspended from cranes shall be attached by shackles to the lower lifting block or other positive means shall be taken to prevent them from becoming accidentally disengaged from the crane hook.

(2) Independent pole wood scaffolds.

(a) All pole uprights shall be set plumb. Poles shall rest on a foundation of sufficient size and strength to distribute the load and to prevent displacement.

(b) In light-duty scaffolds not more than 24 feet in height, poles may be spliced by overlapping the ends not less than 4 feet and securely nailing them together. A substantial cleat shall be nailed to the lower section to form a support for the upper section except when bolted connections are used.

(c) All other poles to be spliced shall be squared at the ends of each splice, abutted, and rigidly fastened together by not less than two cleats securely nailed or bolted thereto. Each cleat shall overlap each pole end by at least 24 inches and shall have a width equal to the face of the pole to which it is attached. The combined cross sectional area of the cleats shall be not less than the cross sectional area of the pole.

(d) Ledgers shall extend over two consecutive pole spaces and shall overlap the poles at each end by not less than 4 inches. They shall be left in position to brace the poles as the platform is raised with the progress of the work. Ledgers shall be level and shall be securely nailed or bolted to each pole and shall be placed against the inside face of each pole.

(e) All bearers shall be set with their greater dimension vertical and shall extend beyond the ledgers upon which they rest.

(f) Diagonal bracing shall be provided between the parallel poles, and cross bracing shall be provided between the inner and outer poles or from the outer poles to the ground.

(g) Minimum dimensions and spacing of members shall be in accordance with Table E-1 in WAC 296-304-07011.

(h) Platform planking shall be in accordance with the requirements of (8) of this section.

(i) Backrails and toeboards shall be in accordance with the requirements of (9) of this section.

(3) Independent pole metal scaffolds.

(a) Metal scaffold members shall be maintained in good repair and free of corrosion.

(b) All vertical and horizontal members shall be fastened together with a coupler or locking device which will form a positive connection. The locking device shall be of a type which has no loose parts.

(c) Posts shall be kept plumb during erection and the scaffold shall be subsequently kept plumb and rigid by means of adequate bracing.

(d) Posts shall be fitted with bases supported on a firm foundation to distribute the load. When wooden sills are used, the bases shall be fastened thereto.

(e) Bearers shall be located at each set of posts, at each level, and at each intermediate level where working platforms are installed.

(f) Tubular bracing shall be applied both lengthwise and crosswise as required.

(g) Platform planking shall be in accordance with the requirements of (8) of this section.

(h) Backrails and toeboards shall be in accordance with the requirements of (9) of this section.

(4) Wood trestle and extension trestle ladders.

(a) The use of trestle ladders, or extension sections or base sections of extension trestle ladders longer than 20 feet is prohibited. The total height of base and extension may, however, be more than 20 feet.

(b) The minimum dimensions of the side rails of the trestle ladder, or the base sections of the extension trestle ladder, shall be as follows:

(i) Ladders up to and including those 16 feet long shall have side rails of not less than 1 5/16 x 2 3/4 inch lumber.

(ii) Ladders over 16 feet long and up to and including those 20 feet long shall have side rails of not less than 1 5/16 x 3 inch lumber.

(c) The side rails of the extension section of the extension trestle ladder shall be parallel and shall have minimum dimensions as follows:

(i) Ladders up to and including 12 feet long shall have side rails of not less than 1 5/16 x 2 1/4 inch lumber.

(ii) Ladders over 12 feet long and up to and including those 16 feet long shall have side rails of not less than 1 5/16 x 2 1/2 inch lumber.

(iii) Ladders over 16 feet long and up to and including those 20 feet long shall have side rails of not less than 1 5/16 x 3 inch lumber. (Rev. 2-17-76)

(d) Trestle ladders and base sections of extension trestle ladders shall be so spread that when in an open position the spread of the trestle at the bottom, inside to inside, shall be

not less than 5 1/2 inches per foot of the length of the ladder.

(e) The width between the side rails at the bottom of the trestle ladder or of the base section of the extension trestle ladder shall be not less than 21 inches for all ladders and sections 6 feet or less in length. For longer lengths of ladder the width shall be increased at least 1 inch for each additional foot of length. The width between the side rails of the extension section of the trestle ladder shall be not less than 12 inches.

(f) In order to limit spreading, the top ends of the side rails of both the trestle ladder and of the base section of the extension trestle ladder shall be beveled, or of equivalent construction, and shall be provided with a metal hinge.

(g) A metal spreader or locking device to hold the front and back sections in an open position, and to hold the extension section securely in the elevated position, shall be a component of each trestle ladder or extension trestle ladder.

(h) Rungs shall be parallel and level. On the trestle ladder, or on the base section of the extension trestle ladder, rungs shall be spaced not less than 8 inches nor more than 18 inches apart; on the extension section of the extension trestle ladder, rungs shall be spaced not less than 6 inches nor more than 12 inches apart.

(i) Platform planking shall be in accordance with the requirements of (8) of this section, except that the width of the platform planking shall not exceed the distance between the siderails.

(j) Backrails and toeboards shall be in accordance with the requirements of (9) of this section.

(5) Painters' suspended scaffolds.

(a) The supporting hooks of swinging scaffolds shall be constructed to be equivalent in strength to mild steel or wrought iron, shall be forged with care, shall be not less than 7/8 inch in diameter, and shall be secured to a safe anchorage at all times.

(b) The ropes supporting a swinging scaffold shall be equivalent in strength to first-grade 3/4 inch diameter manila rope properly rigged into a set of standard 6 inch blocks consisting of at least one double and one single block.

(c) Manila and wire ropes shall be carefully examined before each operation and thereafter as frequently as may be necessary to ensure their safe condition.

(d) Each end of the scaffold platform shall be supported by a wrought iron or mild steel stirrup or hanger, which in turn is supported by the suspension ropes.

(e) Stirrups shall be constructed so as to be equivalent in strength to wrought iron 3/4 inch in diameter.

(f) The stirrups shall be formed with a horizontal bottom member to support the platform, shall be provided with means to support the guardrail and midrail and shall have a loop or eye at the top for securing the supporting hook on the block.

(g) Two or more swinging scaffolds shall not at any time be combined into one by bridging the distance between them with planks or any other form of platform.

(h) No more than two men shall be permitted to work at one time on a swinging scaffold built to the minimum specifications contained in this section. Where heavier construction is used, the number of men permitted to work

on the scaffold shall be determined by the size and the safe working load of the scaffold.

(i) Backrails and toeboards shall be in accordance with the requirements of (9) of this section.

(j) The swinging scaffold platform shall be one of the three types described in (k), (l), and (m) of this section.

(k) The ladder-type platform consists of boards upon a horizontal ladder-like structure, referred to herein as the ladder, the side rails of which are parallel. If this type of platform is used the following requirements shall be met:

(i) The width between the side rails shall be no more than 20 inches.

(ii) The side rails of ladders in ladder-type platforms shall be equivalent in strength to a beam of clear straight-grained spruce of the dimensions contained in Table E-2 in WAC 296-304-07013.

(iii) The side rails shall be tied together with tie rods. The tie rods shall be not less than 5/16 inch in diameter, located no more than 5 feet apart, pass through the rails, and be riveted up tight against washers at both ends.

(iv) The rungs shall be of straight-grained oak, ash, or hickory, not less than 1 1/8 inches diameter, with 7/8 inch tenons mortised into the side rails not less than 7/8 inch and shall be spaced no more than 18 inches on centers.

(v) Flooring strips shall be spaced no more than 5/8 inch apart except at the side rails, where 1 inch spacing is permissible.

(vi) Flooring strips shall be cleated on their undersides.

(l) The plank-type platform consists of planks supported on the stirrups or hangers. If this type of platform is used, the following requirements shall be met:

(i) The planks of plank-type platforms shall be not less than 2 x 10 inch lumber.

(ii) The platform shall be no more than 24 inches in width.

(iii) The planks shall be tied together by cleats of not less than 1 x 6 inch lumber, nailed on their undersides at intervals of not more than 4 feet.

(iv) The planks shall extend not less than 6 inches nor more than 18 inches beyond the supporting stirrups.

(v) A cleat shall be nailed across the platform on the underside at each end outside the stirrup to prevent the platform from slipping off the stirrup.

(vi) Stirrup supports shall be not more than 10 feet apart.

(m) The beam-type platform consists of longitudinal side stringers with cross beams set on edge and spaced not more than 4 feet apart on which longitudinal platform planks are laid. If this type platform is used the following requirements shall be met:

(i) The side stringers shall be of sound, straight-grained lumber, free from knots, and of not less than 2 x 6 inch lumber, set on edge.

(ii) The stringers shall be supported on the stirrups with a clear span between stirrups of not more than 16 feet.

(iii) The stringers shall be bolted to the stirrups by U-bolts passing around the stirrups and bolted through the stringers with nuts drawn up tight on the inside face.

(iv) The ends of the stringers shall extend beyond the stirrups not less than 6 inches nor more than 12 inches at each end of the platform.

(v) The platform shall be supported on cross beams of 2 x 6 inch lumber between the side stringers securely nailed thereto and spaced not more than 4 feet on centers.

(vi) The platform shall be not more than 24 inches wide.

(vii) The platform shall be formed of boards 7/8 inch in thickness by not less than 6 inches in width, nailed tightly together, and extending to the outside face of the stringers.

(viii) The ends of all platform boards shall rest on the top of the cross beams, shall be securely nailed, and at no intermediate points in the length of the platform shall there be any cantilever ends.

(6) Horse scaffolds.

(a) The minimum dimensions of lumber used in the construction of horses shall be in accordance with Table E-3 in WAC 296-304-07011.

(b) Horses constructed of materials other than lumber shall provide the strength, rigidity and security required of horses constructed of lumber.

(c) The lateral spread of the legs shall be equal to not less than one-third of the height of the horse.

(d) All horses shall be kept in good repair, and shall be properly secured when used in staging or in locations where they may be insecure.

(e) Platform planking shall be in accordance with the requirements of (8) of this section.

(f) Backrails and toeboards shall be in accordance with (9) of this section.

(7) Other types of scaffolds.

(a) Scaffolds of a type for which specifications are not contained in this section shall meet the general requirements of (1), (8) and (9) of this section, shall be in accordance with recognized principles of design and shall be constructed in accordance with accepted standards covering such equipment.

(8) Scaffold or platform planking.

(a) Except as otherwise provided in (5)(k) and (m), platform planking shall be of not less than 2 x 10 inch lumber. Platform planking shall be straight-grained and free from large or loose knots and may be either rough or dressed.

(b) Platforms of staging shall be not less than two 10 inch planks in width except in such cases as the structure of the vessel or the width of the trestle ladders make it impossible to provide such a width.

(c) Platform planking shall project beyond the supporting members at either end by at least 6 inches but in no case shall project more than 12 inches unless the planks are fastened to the supporting members.

(d) Table E-4 in WAC 296-304-07011 shall be used as a guide in determining safe loads for scaffold planks.

(9) Backrails and toeboards.

(a) Scaffolding, staging, runways, or working platforms which are supported or suspended more than 5 feet above a solid surface, or at any distance above the water, shall be provided with a railing which has a top rail whose upper surface is from 42 to 45 inches above the upper surface of the staging, platform, or runway and a midrail located halfway between the upper rail and the staging, platform, or runway.

(b) Rails shall be of 2 x 4 inch lumber, flat bar or pipe. When used with rigid supports, taut wire or fiber rope of adequate strength may be used. If the distance between

supports is more than 8 feet, rails shall be equivalent in strength to 2 x 4 inch lumber. Rails shall be firmly secured. Where exposed to hot work or chemicals, fiber rope rails shall not be used.

(c) Rails may be omitted where the structure of the vessel prevents their use. When rails are omitted employees working more than 5 feet above solid surfaces shall be protected by safety belts and life lines meeting the requirements of WAC 296-304-09007(2), and employees working over water shall be protected by personal flotation devices meeting the requirements of WAC 296-304-09007(1).

(d) Employees working from swinging scaffolds which are triced out of a vertical line below their supports or from scaffolds on paint floats subject to surging, shall be protected against falling toward the vessel by a railing or a safety belt and line attached to the backrail.

(e) When necessary, to prevent tools and materials from falling on men below, toeboards of not less than 1 x 4 inch lumber shall be provided.

(10) Access to staging.

(a) Access from below to staging more than 5 feet above a floor, deck or the ground shall consist of well secured stairways, cleated ramps, fixed or portable ladders meeting the applicable requirements of WAC 296-304-05003 or rigid type noncollapsible trestles with parallel and level rungs.

(b) Ramps and stairways shall be provided with 36-inch handrails with midrails.

(c) Ladders shall be so located or other means shall be taken so that it is not necessary for employees to step more than one foot from the ladder to any intermediate landing or platform.

(d) Ladders forming integral parts of prefabricated staging are deemed to meet the requirements of these regulations.

(e) Access from above to staging more than 3 feet below the point of access shall consist of a straight, portable ladder meeting the applicable requirements of WAC 296-304-05003 or a Jacob's ladder properly secured, meeting the requirements of WAC 296-304-05007(4).

[Order 76-7, § 296-304-05001, filed 3/1/76; Order 74-25, § 296-304-05001, filed 5/7/74.]

WAC 296-304-05003 Ladders. (1) General requirements.

(a) The use of ladders with broken or missing rungs or steps, broken or split side rails, or other faulty or defective construction is prohibited. When ladders with such defects are discovered, they shall be immediately withdrawn from service. Inspection of metal ladders shall include checking for corrosion of interiors of open end, hollow rungs.

(b) When sections of ladders are spliced, the ends shall be abutted, and not fewer than 2 cleats shall be securely nailed or bolted to each rail. The combined cross sectional area of the cleats shall be not less than the cross sectional area of the side rail. The dimensions of side rails for their total length shall be those specified in (2) or (3) of this section.

(c) Portable ladders shall be lashed, blocked or otherwise secured to prevent their being displaced. The side rails of ladders used for access to any level shall extend not less

than 36 inches above that level. When this is not practical, grab rails which will provide a secure grip for an employee moving to or from the point of access shall be installed.

(d) Portable metal ladders shall be of strength equivalent to that of wood ladders. Manufactured portable metal ladders provided by the employer shall be in accordance with the provisions of the United States of America Standard Safety Code for Portable Metal Ladders, A14.2.

(e) Portable metal ladders shall not be used near electrical conductors nor for electric arc welding operations.

(f) Manufactured portable wood ladders provided by the employer shall be in accordance with the provisions of the United States of America Standard Safety Code for Portable Wood Ladders, A14.1.

(2) Construction of portable wood cleated ladders up to 30 feet in length.

(a) Wood side rails shall be made from west coast hemlock, eastern spruce, Sitka spruce, or wood of equivalent strength. Material shall be seasoned, straight-grained wood, and free from shakes, checks, decay or other defects which will impair its strength. The use of low density woods is prohibited.

(b) Side rails shall be dressed on all sides, and kept free of splinters.

(c) All knots shall be sound and hard. The use of material containing loose knots is prohibited. Knots shall not appear on the narrow face of the rail and, when in the side face, shall be not more than 1/2 inch in diameter or within 1/2 inch of the edge of the rail or nearer than 3 inches to a tread or rung.

(d) Pitch pockets not exceeding 1/8 inch in width, 2 inches in length and 1/2 inch in depth are permissible in wood side rails, provided that not more than one such pocket appears in each 4 feet of length.

(e) The width between side rails at the base shall be not less than 11 1/2 inches for ladders 10 feet or less in length. For longer ladders this width shall be increased at least 1/4 inch for each additional 2 feet in length.

(f) Side rails shall be at least 1 5/8 x 3 5/8 inches in cross section.

(g) Cleats (meaning rungs rectangular in cross section with the wide dimension parallel to the rails) shall be of the material used for side rails, straight-grained and free from knots. Cleats shall be mortised into the edges of the side rails 1/2 inch, or filler blocks shall be used on the rails between the cleats. The cleats shall be secured to each rail with three 10d common wire nails or fastened with through bolts or other fasteners of equivalent strength. Cleats shall be uniformly spaced not more than 12 inches apart.

(h) Cleats 20 inches or less in length shall be at least 25/32 x 3 inches in cross section. Cleats over 20 inches but not more than 30 inches in length shall be at least 25/32 x 3 3/4 inches in cross section.

(3) Construction of portable wood cleated ladders from 30 to 60 feet in length.

(a) Ladders from 30 to 60 feet in length shall be in accordance with the specifications of (2) of this section with the following exceptions:

(i) Rails shall be of not less than 2 x 6 inch lumber.

(ii) Cleats shall be of not less than 1 x 4 inch lumber.

(iii) Cleats shall be nailed to each rail with five 10d common wire nails or fastened with through bolts or other fastenings of equivalent strength.

[Order 74-25, § 296-304-05003, filed 5/7/74.]

WAC 296-304-05005 Guarding of deck openings and edges. (1) When employees are working in the vicinity of flush manholes and other small openings of comparable size in the deck and other working surfaces, such openings shall be suitably covered or guarded to a height of not less than 30 inches, except where the use of such guards is made impracticable by the work actually in progress.

(2) When employees are working around open hatches not protected by coamings to a height of 24 inches or around other large openings, the edge of the opening shall be guarded in the working area to a height of 36 to 42 inches, except where the use of such guards is made impracticable by the work actually in progress.

(3) When employees are exposed to unguarded edges of decks, platforms, flats, and similar flat surfaces, more than 5 feet above a solid surface, the edges shall be guarded by adequate guardrails meeting the requirements of WAC 296-304-05001 (1)(a) and (b), unless the nature of the work in progress or the physical conditions prohibit the use or installation of such guardrails.

(4) When employees are working near the unguarded edges of decks of vessels afloat, they shall be protected by buoyant work vests, meeting the requirements of WAC 296-304-09007(1).

(5) Sections of bilges from which floor plates or gratings have been removed shall be guarded by guardrails except where they would interfere with work in progress. If these open sections are in a walkway at least two 10-inch planks placed side by side, or equivalent, shall be laid across the opening to provide a safe walking surface.

(6) Gratings, walkways, and catwalks, from which sections or ladders have been removed, shall be barricaded with adequate guardrails.

[Order 74-25, § 296-304-05005, filed 5/7/74.]

WAC 296-304-05007 Access to vessels. (1) Access to vessels afloat. The employer shall not permit employees to board or leave any vessel, except a barge or river towboat, until the following requirements have been met:

(a) Whenever practicable, a gangway of not less than 20 inches walking surface, of adequate strength, maintained in safe repair and safely secured shall be used. If a gangway is not practicable, a substantial straight ladder, extending at least 36 inches above the upper landing surface and adequately secured against shifting or slipping shall be provided. When conditions are such that neither a gangway nor a straight ladder can be used, a Jacob's ladder meeting the requirements of (4)(a) and (b) of this section may be used.

(b) Each side of such gangway, and the turntable if used, shall have a railing with a minimum height of approximately 33 inches measured perpendicularly from rail to walking surface at the stanchion, with a midrail. Rails shall be of wood, pipe, chain, wire or rope and shall be kept taut at all times.

(c) Gangways on vessels inspected and certificated by the U.S. Coast Guard are deemed to meet the foregoing

requirements, except in cases where the vessel's regular gangway is not being used.

(d) The gangway shall be kept properly trimmed at all times.

(e) When a fixed tread accommodation ladder is used, and the angle is low enough to require employees to walk on the edge of the treads, cleated duckboards shall be laid over and secured to the ladder.

(f) When the lower end of a gangway overhangs the water between the ship and the dock in such a manner that there is danger of employees falling between the ship and the dock, a net or other suitable protection shall be rigged at the foot of the gangway in such a manner as to prevent employees from falling from the end of the gangway.

(g) If the foot of the gangway is more than one foot away from the edge of the apron, the space between them shall be bridged by a firm walkway equipped with railings, with a minimum height of approximately 33 inches with midrails on both sides.

(h) Supporting bridles shall be kept clear so as to permit unobstructed passage for employees using the gangway.

(i) When the upper end of the means of access rests on or flush with the top of the bulwark, substantial steps properly secured and equipped with at least one substantial handrail approximately 33 inches in height shall be provided between the top of the bulwark and the deck.

(j) Obstructions shall not be laid on or across the gangway.

(k) The means of access shall be adequately illuminated for its full length.

(1) Unless the construction of the vessel makes it impossible, the means of access shall be so located that drafts of cargo do not pass over it. In any event loads shall not be passed over the means of access while employees are on it.

(2) Access to vessels in drydock or between vessels. Gangways meeting the requirements of (1)(a), (b), (i), (j) and (l) of this section shall be provided for access from wing wall to vessel or, when two or more vessels, other than barges or river towboats, are lying abreast, from one vessel to another.

(3) Access to barges and river towboats.

(a) Ramps for access of vehicles to or between barges shall be of adequate strength, provided with side boards, well maintained and properly secured.

(b) Unless employees can step safely to or from the wharf, float, barge, or river towboat, either a ramp in accordance with the requirements of (a) of this section or a safe walkway in accordance with the requirements of (1)(g) of this section shall be provided. When a walkway is impracticable, a substantial straight ladder, extending at least 36 inches above the upper landing surface and adequately secured against shifting or slipping shall be provided. When conditions are such that neither a walkway nor a straight ladder can be used, a Jacob's ladder in accordance with the requirements of (4) of this section may be used.

(c) The means of access shall be in accordance with the requirements of (1)(i), (j) and (k) of this section.

(4) Jacob's ladders. (a) Jacob's ladders shall be of the double rung or flat tread type. They shall be well maintained and properly secured.

(b) A Jacob's ladder shall either hang without slack from its lashings or be pulled up entirely.

[Order 74-25, § 296-304-05007, filed 5/7/74.]

WAC 296-304-05009 Access to and guarding of dry docks and marine railings. (1) A gangway, ramp or permanent stairway of not less than 20 inches walking surface, of adequate strength, maintained in safe repair and securely fastened, shall be provided between a floating dry dock and the pier or bulkhead.

(2) Each side of such gangway, ramp or permanent stairway, including those which are used for access to wing walls from dry dock floors, shall have a railing with a midrail. Such railings on gangways or ramps shall be approximately 42 inches in height; and railings on permanent stairways shall be not less than approximately 30 or more than approximately 34 inches in height. Rails shall be of wood, pipe, chain, wire, or rope and shall be kept taut at all times.

(3) Railings meeting the requirements of (2) of this section shall be provided on the means of access to and from the floors of graving docks.

(4) Railings approximately 42 inches in height, with a mid rail, shall be provided on the edges of wing walls of floating dry docks and on the edges of graving docks. Sections of the railings may be temporarily removed where necessary to permit line handling while a vessel is entering or leaving the dock.

(5) When employees are working on the floor of a floating dry dock where they are exposed to the hazard of falling into the water, the end of the dry dock shall be equipped with portable stanchions and 42 inch railings with a midrail. When such a railing would be impracticable or ineffective, other effective means shall be provided to prevent men from falling into the water.

(6) Access to wingwalls from floors of dry docks shall be by ramps, permanent stairways or ladders meeting the applicable requirements of WAC 296-304-05003.

(7) Catwalks on stiles of marine railways shall be no less than 20 inches wide and shall have on at least one side a guardrail and midrail meeting the requirements of WAC 296-304-05001 (9)(a) and (b).

[Order 74-25, § 296-304-05009, filed 5/7/74.]

WAC 296-304-05011 Access to cargo spaces and confined spaces. (1) Cargo spaces.

(a) There shall be at least one safe and accessible ladder in any cargo space which employees must enter.

(b) When any fixed ladder is visibly unsafe, the employer shall prohibit its use by employees.

(c) Straight ladders of adequate strength and suitably secured against shifting or slipping shall be provided as necessary when fixed ladders in cargo spaces do not meet the requirements of (a) of this section. When conditions are such that a straight ladder cannot be used, a Jacob's ladder meeting the requirements of WAC 296-304-05007(4) may be used.

(d) When cargo is stowed within 4 inches of the back of ladder rungs, the ladder shall be deemed "unsafe" for the purpose of this section.

(e) Fixed ladders or straight ladders provided for access to cargo spaces shall not be used at the same time that cargo drafts or other loads are entering or leaving the hold. Before using these ladders to enter or leave the hold, the employee shall be required to inform the winchman or crane signalman of his intention.

(2) Confined spaces.

(a) More than one means of access shall be provided to a confined space in which employees are working and in which the work may generate a hazardous atmosphere in the space except where the structure or arrangement of the vessel makes this provision impractical.

(b) When the ventilation ducts required by these regulations must pass through these means of access, the ducts shall be of such a type and so arranged as to permit free passage of an employee through at least two of these means of access.

[Order 74-25, § 296-304-05011, filed 5/7/74.]

WAC 296-304-05013 Working surfaces. (1) When firebox floors present tripping hazards of exposed tubing or of missing or removed refractory, sufficient planking to afford safe footing shall be laid while work is being carried on within the boiler.

(2) When employees are working aloft, or elsewhere at elevations more than 5 feet above a solid surface, either scaffolds or a sloping ladder, meeting the requirements of this section, shall be used to afford safe footing, or the employees shall be protected by safety belts and lifelines meeting the requirements of WAC 296-304-09007(2). Employees visually restricted by blasting hoods, welding helmets, and burning goggles shall work from scaffolds, not from ladders, except for the initial and final welding or burning operation to start or complete a job such as the erection and dismantling of hung scaffolding, or other similar, nonrepetitive jobs of brief duration.

(3) For work performed in restricted quarters, such as behind boilers and in between congested machinery units and piping, work platforms at least 20 inches wide meeting the requirements of WAC 296-304-05001 (8)(b) shall be used. Backrails may be omitted if bulkheading, boilers, machinery units, or piping afford proper protection against falling.

(4) When employees are boarding, leaving, or working from small boats or floats, they shall be protected by personal flotation devices meeting the requirements of WAC 296-304-09007(1).

[Order 76-7, § 296-304-05013, filed 3/1/76; Order 74-25, § 296-304-05013, filed 5/7/74.]

WAC 296-304-060 General working conditions—Scope and application. All sections of this chapter which include WAC 296-304-060 in the section number apply to general working conditions.

[Order 74-25, § 296-304-060, filed 5/7/74.]

WAC 296-304-06001 Housekeeping. (1) Good housekeeping conditions shall be maintained at all times. Adequate aisles and passageways shall be maintained in all work areas. All staging platforms, ramps, stairways, walkways, aisles, and passageways on vessels or dry docks

shall be kept clear of all tools, materials, and equipment except that which is in use, and all debris such as welding rod tips, bolts, nuts, and similar material. Hose and electric conductors shall be elevated over or placed under the walkway or working surfaces or covered by adequate crossover planks.

(2) All working areas on vessels and dry docks shall be kept reasonably free of debris, and construction material shall be so piled as not to present a hazard to employees.

(3) Slippery conditions on walkways or working surfaces shall be eliminated as they occur.

(4) Free access shall be maintained at all times to all exits and to all fire-alarm boxes or fire-extinguishing equipment.

(5) All oils, paints, thinners, solvents waste, rags, or other flammable substances shall be kept in fire resistant covered containers when not in use.

[Order 74-25, § 296-304-06001, filed 5/7/74.]

WAC 296-304-06003 Illumination. (1) All means of access and walkways leading to working areas as well as the working areas themselves shall be adequately illuminated.

(2) Temporary lights shall meet the following requirements:

(a) Temporary lights shall be equipped with guards to prevent accidental contact with the bulb, except that guards are not required when the construction of the reflector is such that the bulb is deeply recessed.

(b) Temporary lights shall be equipped with heavy duty electric cords with connections and insulation maintained in safe condition. Temporary lights shall not be suspended by their electric cords unless cords and lights are designed for this means of suspension. Splices which have insulation equal to that of the cable are permitted.

(c) Cords shall be kept clear of working spaces and walkways or other locations in which they are readily exposed to damage.

(3) Exposed noncurrent-carrying metal parts of temporary lights furnished by the employer shall be grounded either through a third wire in the cable containing the circuit conductors or through a separate wire which is grounded at the source of the current. Grounding shall be in accordance with the requirements of WAC 296-304-08003(2).

(4) Where temporary lighting from sources outside the vessel is the only means of illumination, portable emergency lighting equipment shall be available to provide illumination for safe movement of employees.

(5) Employees shall not be permitted to enter dark spaces without a suitable portable light. The use of matches and open flame lights is prohibited. In nongas free spaces, portable lights shall meet the requirements of WAC 296-304-02005(2).

(6) Temporary lighting stringers or streamers shall be so arranged as to avoid overloading of branch circuits. Each branch circuit shall be equipped with overcurrent protection of capacity not exceeding the rated current carrying capacity of the cord used.

[Order 74-25, § 296-304-06003, filed 5/7/74.]

WAC 296-304-06005 Utilities. (1) Steam supply and hoses.

(a) Prior to supplying a vessel with steam from a source outside the vessel, the employer shall ascertain from responsible vessel's representatives, having knowledge of the condition of the plant, the safe working pressure of the vessel's steam system. The employer shall install a pressure gauge and a relief valve of proper size and capacity at the point where the temporary steam hose joins the vessel's steam piping system or systems. The relief valve shall be set and capable of relieving at a pressure not exceeding the safe working pressure of the vessel's system in its present condition, and there shall be no means of isolating the relief valve from the system which it protects. The pressure gauge and relief valve shall be located so as to be visible and readily accessible.

(b) Steam hose and fittings shall have a safety factor of not less than five.

(c) When steam hose is hung in a bight or bights, the weight shall be relieved by appropriate lines. The hose shall be protected against chafing.

(d) Steam hose shall be protected from damage and hose and temporary piping shall be so shielded where passing through normal work areas as to prevent accidental contact by employees.

(2) Electric power.

(a) When the vessel is supplied with electric power from a source outside the vessel, the following precautions shall be taken prior to energizing the vessel's circuits:

(i) If in dry dock, the vessel shall be adequately grounded.

(ii) The employer shall ascertain from responsible vessel's representatives, having a knowledge of the condition of the vessel's electrical system, that all circuits to be energized are in a safe condition.

(iii) All circuits to be energized shall be equipped with overcurrent protection of capacity not exceeding the rated current carrying capacity of the cord used.

(3) Infrared electrical heat lamps.

(a) All infrared electrical heat lamps shall be equipped with guards that surround the lamps with the exception of the face, to minimize accidental contact with the lamps.

[Order 74-25, § 296-304-06005, filed 5/7/74.]

WAC 296-304-06007 Work in confined or isolated spaces. When any work is performed in a confined space, except as provided in WAC 296-304-04001 (2)(c), or when an employee is working alone in an isolated location, frequent checks shall be made to ensure the safety of the employees.

[Order 74-25, § 296-304-06007, filed 5/7/74.]

WAC 296-304-06009 Work on or in the vicinity of radar and radio. (1) No employees other than radar or radio repairmen shall be permitted to work on masts, king posts or other aloft areas unless the radar and radio are secured or otherwise made incapable of radiation. In either event, the radio and radar shall be appropriately tagged.

(2) Testing of radar or radio shall not be done until the employer can schedule such tests at a time when no work is in progress aloft or personnel can be cleared from the danger area according to minimum safe distances established for and based on the type, model, and power of the equipment.

[Title 296 WAC—page 2288]

[Order 74-25, § 296-304-06009, filed 5/7/74.]

WAC 296-304-06011 Work in or on lifeboats. (1) Before employees are permitted to work in or on a lifeboat, either stowed or in a suspended position, the employer shall ensure that the boat is secured independently of the releasing gear to prevent the boat from falling due to accidental tripping of the releasing gear and movement of the davits or capsizing of a boat in chocks.

(2) Employees shall not be permitted to remain in boats while the boats are being hoisted into final stowed position.

(3) Employees shall not be permitted to work on the outboard side of lifeboats stowed on their chocks unless the boats are secured by gripes or otherwise secured to prevent them from swinging outboard.

[Order 74-25, § 296-304-06011, filed 5/7/74.]

WAC 296-304-06013 Health and sanitation. (1) No chemical product, such as a solvent or preservative; no structural material, such as cadmium or zinc coated steel, or plastic material; and no process material, such as welding filler metal; which is a hazardous material within the meaning of WAC 296-304-01001(21), shall be used until the employer has ascertained the potential fire, toxic, or reactivity hazards which are likely to be encountered in the handling, application, or utilization of such a material.

(2) In order to ascertain the hazards, as required by subsection (1) of this section, the employer shall obtain the following items of information which are applicable to a specific product or material to be used:

(a) The name, address, and telephone number of the source of the information specified in this section preferably those of the manufacturer of the product or material.

(b) The trade name and synonyms for a mixture of chemicals, a basic structural material, or for a process material; and the chemical name and synonyms, chemical family, and formula for a single chemical.

(c) Chemical names of hazardous ingredients, including, but not limited to, those in mixtures, such as those in: (i) Paints, preservatives, and solvents; (ii) alloys, metallic coatings, filler metals and their coatings or core fluxes; and (iii) other liquids, solids, or gases (e.g., abrasive materials).

(d) An indication of the percentage, by weight or volume, which each ingredient of a mixture bears to the whole mixture, and of the threshold limit value of each ingredient, in appropriate units.

(e) Physical data about a single chemical or a mixture of chemicals, including boiling point, in degrees Fahrenheit; vapor pressure, in millimeters of mercury; vapor density of gas or vapor (air=1); solubility in water, in percent by weight; specific gravity of material (water=1); percentage volatile, by volume, at 70°F.; evaporation rate for liquids (either butyl acetate or ether may be taken as 1); and appearance and odor.

(f) Fire and explosion hazard data about a single chemical or a mixture of chemicals, including flashpoint, in degrees Fahrenheit; flammable limits, in percent by volume in air; suitable extinguishing media or agents; special fire fighting procedures; and unusual fire and explosion hazard information.

(g) Health hazard data, including threshold limit value, in appropriate units, for a single hazardous chemical or for the individual hazardous ingredients of a mixture as appropriate, effects of overexposure; and emergency and first aid procedures.

(h) Reactivity data, including stability, incompatibility, hazardous decomposition products, and hazardous polymerization.

(i) Procedures to be followed and precautions to be taken in cleaning up and disposing of materials leaked or spilled.

(j) Special protection information, including use of personal protective equipment, such as respirators, eye protection, and protective clothing, and of ventilation, such as local exhaust, general, special, or other types.

(k) Special precautionary information about handling and storing.

(l) Any other general precautionary information.

(3) The pertinent information required by subsection (2) of this section shall be recorded either on United States Department of Labor Form LSB 00S-4, Material Safety Data Sheet, or on an essentially similar form which has been approved by the department of labor and industries. Copies of Form LSB 00S-4 may be obtained at any of the following regional offices of the occupational safety and health administration:

(a) Pacific region. (Arizona, California, Hawaii, and Nevada.)

10353 Federal Building, 450 Golden Gate Avenue, Box 36017, San Francisco, Calif. 94102.

(b) Region X, OSHA, (Alaska, Washington, Idaho, and Oregon), Federal Office Building, 909 First Avenue, Seattle, Washington 98174.

A completed MSDS form shall be preserved and available for inspection for each hazardous chemical on the worksite.

(4) The employer shall instruct employees who will be exposed to the hazardous materials as to the nature of the hazards and the means of avoiding them.

(5) The employer shall provide all necessary controls, and the employees shall be protected by suitable personal protective equipment against the hazards identified under subsection (1) of this section and those hazards for which specific precautions are required in WAC 296-304-020 through 296-304-04013.

(6) The employer shall provide adequate washing facilities for employees engaged in the application of paints or coatings or in other operations where contaminants can, by ingestion or absorption, be detrimental to the health of the employees. The employer shall encourage good personal hygiene practices by informing the employees of the need for removing surface contaminants by thorough washing of hands and face prior to eating or smoking.

(7) The employer shall not permit eating or smoking in areas undergoing surface preparation or preservation or where shiprepairing, shipbuilding, or shipbreaking operations produce atmospheric contamination.

(8) The employer shall not permit employees to work in the immediate vicinity of uncovered garbage and shall ensure that employees working beneath or on the outboard side of a vessel are not subject to contamination by drainage or waste from overboard discharges.

(9) Requirements of chapter 296-62 WAC, Part C, hazard communication, will apply to shiprepairing, shipbuilding, and shipbreaking when potential hazards of chemicals and communicating information concerning hazards and appropriate protective equipment is applicable to an operation.

[Statutory Authority: Chapter 49.17 RCW. 95-04-006, § 296-304-06013, filed 1/18/95, effective 3/10/95; 88-14-108 (Order 88-11), § 296-304-06013, filed 7/6/88; Order 76-7, § 296-304-06013, filed 3/1/76; Order 74-25, § 296-304-06013, filed 5/7/74.]

WAC 296-304-06015 First aid. (1) Unless a first-aid room and a qualified attendant are close at hand and prepared to render first aid to employees on behalf of the employer, the employer shall furnish a first-aid kit for each vessel on which work is being performed, except that when work is being performed on more than one small vessel at one pier, only one kit shall be required. The kit, when required, shall be kept close to the vessel and at least one employee, close, at hand, shall be qualified to administer first aid to the injured.

(2) The first-aid kit shall consist of a weatherproof container with individual sealed packages for each type of item. The contents of such kit shall contain a sufficient quantity of at least the following types of items:

Gauze roller bandages, 1 inch and 2 inch.

Gauze compress bandages, 4 inch.

Adhesive bandages, 1 inch.

Triangular bandage, 40 inch.

Ammonia inhalants and ampules.

Antiseptic applicators or swabs.

Burn dressing.

Eye dressing.

Wire or thin board splints.

Forceps and tourniquet.

(3) The contents of the first-aid kit shall be checked before being sent out on each job and at least weekly on each job to ensure that the expended items are replaced.

(4) There shall be available for each vessel on which ten or more employees are working one Stokes basket stretcher, or equivalent, permanently equipped with bridles for attaching to the hoisting gear, except that no more than two stretchers are required on each job location. A blanket or other liner suitable for transferring the patient to and from the stretcher shall be provided. Stretchers shall be kept close to the vessels. This section does not apply where ambulance services which are available are known to carry such stretchers.

[Order 74-25, § 296-304-06015, filed 5/7/74.]

WAC 296-304-070 Gear and equipment for rigging and materials handling—Scope and application. All sections of this chapter which include WAC 296-304-070 in the section number apply to gear and equipment for rigging and materials handling.

[Order 74-25, § 296-304-070, filed 5/7/74.]

WAC 296-304-07001 Inspection. (1) All gear and equipment provided by the employer for rigging and materials handling shall be inspected before each shift and, when

necessary, at intervals during its use to ensure that is safe. Defective gear shall be removed and repaired or replaced before further use.

(2) The safe working load of gear as specified in WAC 296-304-07003 and 296-304-07005 shall not be exceeded.

[Order 74-25, § 296-304-07001, filed 5/7/74.]

WAC 296-304-07003 Ropes, chains and slings. (1) Manila rope and manila rope slings.

(a) Table G-1 in WAC 296-304-07011 shall be used to determine the safe working load of various sizes of manila rope and manila rope slings at various angles, except that higher safe working loads are permissible when recommended by the manufacturer for specific, identifiable products: *Provided*, That a safety factor of not less than five is maintained.

(2) Wire rope and wire rope slings.

(a) Tables G-2 through G-5 in WAC 296-304-07011 shall be used to determine the safe working loads of various sizes and classifications of improved plow steel wire rope and wire rope slings with various types of terminals. For sizes, classifications and grades not included in these tables, the safe working load recommended by the manufacturer for specific, identifiable products shall be followed: *Provided*, That a safety factor of not less than five is maintained.

(b) Protruding ends of strands in splices on slings and bridles shall be covered or blunted.

(c) Where U-bolt wire rope clips are used to form eyes, Table G-6 in WAC 296-304-07011 shall be used to determine the number and spacing of clips. The U-bolt shall be applied so that the "U" section is in contact with the dead end of the rope.

(d) Wire rope shall not be secured by knots.

(3) Chains and chain slings.

(a) Tables G-7 and G-8 in WAC 296-304-07011 shall be used to determine the working load limit of various sizes of wrought iron and alloy steel chains and chain slings, except that higher safe working loads are permissible when recommended by the manufacturer for specific, identifiable products.

(b) All sling chains, including end fastenings, shall be given a visual inspection before being used on the job. A thorough inspection of all chains in use shall be made every 3 months. Each chain shall bear an indication of the month in which it was thoroughly inspected. The thorough inspection shall include inspection for wear, defective welds, deformation and increase in length or stretch.

(c) Interlink wear, not accompanied by stretch in excess of 5 percent, shall be noted and the chain removed from service when maximum allowable wear at any point of link, as indicated in Table G-9 in WAC 296-304-07011 has been reached.

(d) Chain slings shall be removed from service when, due to stretch, the increase in length of a measured section exceeds five percent; when a link is bent, twisted or otherwise damaged; or when raised scarfs or defective welds appear.

(e) All repairs to chains shall be made under qualified supervision. Links or portions of the chain found to be defective as described in (d) of this section shall be replaced by links having proper dimensions and made of material

similar to that of the chain. Before repaired chains are returned to service, they shall be proof tested to the proof test load recommended by the manufacturer.

(f) Wrought iron chains in constant use shall be annealed or normalized at intervals not exceeding six months when recommended by the manufacturer. The chain manufacturer shall be consulted for recommended procedures for annealing or normalizing. Alloy chains shall never be annealed.

(g) A load shall not be lifted with a chain having a kink or knot in it. A chain shall not be shortened by bolting, wiring or knotting.

[Order 76-7, § 296-304-07003, filed 3/1/76; Order 74-25, § 296-304-07003, filed 5/7/74.]

WAC 296-304-07005 Shackles and hooks. (1) Shackles.

(a) Table G-10 in WAC 296-304-07011 shall be used to determine the safe working loads of various sizes of shackles, except that higher safe working loads are permissible when recommended by the manufacturer for specific, identifiable products: *Provided*, That a safety factor of not less than five is maintained.

(2) Hooks.

(a) The manufacturer's recommendations shall be followed in determining the safe working loads of the various sizes and types of specific and identifiable hooks. All hooks for which no applicable manufacturer's recommendations are available shall be tested to twice the intended safe working load before they are initially put into use. The employer shall maintain a record of the dates and results of such tests.

(b) Loads shall be applied to the throat of the hook since loading the point overstresses and bends or springs the hook.

(c) Hooks shall be inspected periodically to see that they have not been bent by overloading. Bent or sprung hooks shall not be used.

[Order 76-7, § 296-304-07005, filed 3/1/76; Order 74-25, § 296-304-07005, filed 5/7/74.]

WAC 296-304-07007 Chain falls and pull-lifts. (1) Chain falls and pull-lifts shall be clearly marked to show the capacity and the capacity shall not be exceeded.

(2) Chain falls shall be regularly inspected to ensure that they are safe, particular attention being given to the lift chain, pinion, sheaves and hooks for distortion and wear. Pull-lifts shall be regularly inspected to ensure that they are safe, particular attention being given to the ratchet, pawl, chain and hooks for distortion and wear.

(3) Straps, shackles, and the beam or overhead structure to which a chain fall or pull-lift is secured shall be of adequate strength to support the weight of load plus gear. The upper hook shall be moused or otherwise secured against coming free of its support.

(4) Scaffolding shall not be used as a point of attachment for lifting devices, such as tackles, chain falls, and pull-lifts unless the scaffolding is specifically designed for that purpose.

[Order 74-25, § 296-304-07007, filed 5/7/74.]

WAC 296-304-07009 Hoisting and hauling equipment. (1) Derrick and crane certification:

(a) Derricks and cranes which are part of, or regularly placed aboard barges, other vessels, or on wingwalls of floating drydocks, and are used to transfer materials or equipment from or to a vessel or drydock, shall be tested and certificated in accordance with the standards provided in WAC 296-304-130 gear certification, by persons accredited for that purpose.

(b)(a) of this section shall take effect 180 days after the effective date of the amendment.

(2) The moving parts of hoisting and hauling equipment shall be guarded.

(3) Mobile crawler or truck cranes used on a vessel:

(a) The maximum manufacturer's rated safe working loads for the various working radii of the boom and the maximum and minimum radii at which the boom may be safely used with and without outriggers shall be conspicuously posted near the controls and shall be visible to the operator. A radius indicator shall be provided.

(b) The posted safe working loads of mobile crawler or truck cranes under the conditions of use shall not be exceeded.

(4) Accessible areas within the swing radius of the outermost part of the body of a revolving derrick or crane either permanently or temporarily mounted, shall be guarded in such a manner as to prevent an employee from being in such a position as to be struck by the crane or caught between the crane and fixed parts of the vessel or of the crane itself.

(5) Marine railways:

(a) The cradle or carriage on the marine railway shall be positively blocked or secured when in the hauled position to prevent it from being accidentally released.

[Order 74-25, § 296-304-07009, filed 5/7/74.]

WAC 296-304-07011 Use of gear. (1) Loads shall be safely rigged before being hoisted.

(2) Plates shall be handled on and off hulls by means of shackles whenever possible. Clips or pads of ample size shall be welded to the plate to receive the shackle pins whenever there are no holes in the plate. When it is not possible to make holes in or to weld pads to the plate, alligator tongs, grab hooks, grab clamps or screw clamps may be used. In such cases special precautions shall be taken to keep employees from under such lifts.

(3) Tag lines shall be provided on loads likely to swing or to need guidance.

(4) When slings are secured to eyebolts, the slings shall be so arranged, using spreaders if necessary, that the pull is within 20 degrees of the axis of the bolt.

(5) Slings shall be padded by means of wood blocks or other suitable material where they pass over sharp edges or corners of loads so as to prevent cutting or kinking.

(6) Skips shall be rigged to be handled by not less than 3 legged bridles, and all legs shall always be used. When open end skips are used, means shall be taken to prevent the contents from falling.

(7) Loose ends of idle legs of slings in use shall be hung on the hook.

(8) Employees shall not be permitted to ride the hook or the load.

(9) Loads (tools, equipment or other materials) shall not be swung or suspended over the heads of employees.

(10) Pieces of equipment or structure susceptible to falling or dislodgement shall be secured or removed as early as possible.

(11) An individual who is familiar with the signal code in use shall be assigned to act as a signalman when the hoist operator cannot see the load being handled. Communications shall be made by means of clear and distinct visual or auditory signals except that verbal signals shall not be permitted.

(12) Pallets, when used, shall be of such material and construction and so maintained as to safely support and carry the loads being handled on them.

(13) A section of hatch through which materials or equipment are being raised, lowered, moved, or otherwise shifted manually or by a crane, winch, hoist, or derrick, shall be completely opened. The beam or pontoon left in place adjacent to an opening shall be sufficiently lashed, locked or otherwise secured to prevent it from being unshipped so that it cannot be displaced by accident.

(14) Hatches shall not be opened or closed while employees are in the square of the hatch below.

(15) Before loads or empty lifting gear are raised, lowered, or swung, clear and sufficient advance warning shall be given to employees in the vicinity of such operations.

(16) At no time shall an employee be permitted to place himself in hazardous position between a swinging load and a fixed object.

[Order 74-25, § 296-304-07011, filed 5/7/74.]

WAC 296-304-07013 Qualifications of operators.

(1) When ship's gear is used to hoist materials aboard, a competent person shall determine that the gear is properly rigged, that it is in safe condition, and that it will not be overloaded by the size and weight of the lift.

(2) Only those employees who understand the signs, notices, and operating instructions, and are familiar with the signal code in use, shall be permitted to operate a crane, winch, or other power operated hoisting apparatus.

(3) No employee known to have defective uncorrected eyesight or hearing, or to be suffering from heart disease, epilepsy, or similar ailments which may suddenly incapacitate him, shall be permitted to operate a crane, winch or other power operated hoisting apparatus.

(4) No minor under eighteen years of age shall be employed in occupations involving the operation of any power-driven hoisting apparatus or assisting in such operations by work such as hooking on, loading slings, rigging gear, etc.

TABLE E-1

DIMENSIONS AND SPACING OF WOOD INDEPENDENT-POLE SCAFFOLD MEMBERS

Structural Members	Light duty (Up to 25 pounds per square foot)			Heavy duty (25 to 75 pounds per square foot)		
	Height in feet			Height in feet		
	24 or less	24-40	40-60	24 or less	24-40	40-60
Poles or uprights (in inches)	2x4	3x4 or 4x4	4x4	3x4	4x4	4x6
Bearers (in inches)	2x4	2x6	2x6	2x8	2x8	2x10
Ledgers (in inches)	2x6	2x6	2x6	2x8	2x8	2x8
Stringer (not supporting bearers) (in inches)	1x6	1x6	1x6	1x6	1x6	1x6
Braces (in inches)	1x4	1x6	1x6	1x6	1x6	1x6
Pole spacing—longitudinally (in feet)	7 1/2	7 1/2	7 1/2	7	7	7
Pole spacing—transversely (in feet)	6 1/2 min	7 1/2 min	8 1/2 min	6 1/2	10	10
Ledger spacing—vertically (in feet)	7	7	7	4 1/2	4 1/2	4 1/2

TABLE E-2

SPECIFICATIONS FOR SIDE RAILS OF LADDERS

Length (in feet)	Cross section (inches)	
	At ends	At center
15	1 7/8 x 2 3/4	1 7/8 x 3 3/4
16	1 7/8 x 2 3/4	1 7/8 x 3 3/4
17	1 7/8 x 3	1 7/8 x 4
18	1 7/8 x 3	1 7/8 x 4
20	1 7/8 x 3	1 7/8 x 4 1/2
24	1 7/8 x 3	1 7/8 x 4 1/2

TABLE E-3

SPECIFICATIONS FOR THE CONSTRUCTION OF HORSES

Structural Members	Height in feet		
	Up to 10	10 to 16	16 to 20
	Inches	Inches	Inches
Legs	2x4	3x4	4x6
Bearers or headers	2x6	2x8	4x6
Crossbraces	2x4 or 1x8	2x4	2x6
Longitudinal braces	2x4	2x6	2x6

TABLE E-4

SAFE CENTER LOADS FOR SCAFFOLD PLANK OF 1,100 POUNDS FIBRE STRESS

[Codification note: The graphic presentation of this table has been varied in order that it would fall within the printing specifications for the Washington Administrative Code. The following table had lumber dimensions in the table heading

typed in vertically across the page while the remainder of the table was typed horizontally on the page. The "Span in Feet" materials (6 through 16) which ran top to bottom has been switched to run left to right on the page. The "Lumber dimensions in inches" which ran left to right on the page has been switched to run top to bottom on the page.]

Lumber dimensions in inches	Span in Feet					
	6	8	10	12	14	16
A-2 x 10						
B-1 5/8 x 9 1/2	256	192	153	128	110	—
A-2 x 12						
B-1 5/8 x 11 1/2	309	232	186	155	133	116
A-3 x 8						
B-2 5/8 x 7 1/2	526	395	316	263	225	197
A-3 x 10						
B-2 5/8 x 9 1/2	667	600	400	333	286	250
A-3 x 12						
B-2 5/8 x 11 1/2	807	605	484	404	346	303

(A)—Rough lumber.
(B)—Dressed lumber.

TABLE G-1

MANILA ROPE

(in pounds or tons of 2000 pounds)

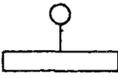
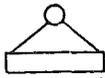
Circumference	Diameter in Inches	Single Leg	60°	45°	30°
					
3/4	1/4	120 lbs.	204 lbs.	170 lbs.	120 lbs.
1	5/16	200	346	282	200
1-1/8	3/8	270	467	380	270
1-1/4	7/16	350	605	493	350
1-3/8	15/32	450	775	635	450
1-1/2	1/2	530	915	798	530
1-3/4	9/16	690	1190	973	690
2	5/8	880	1520	1240	880
2-1/4	3/4	1080	1870	1520	1080
2-1/2	13/16	1300	2250	1830	1300
2-3/4	7/8	1540	2660	2170	1540
3	1	1800	3120	2540	1800
3-1/4	1-1/16	1.0 tons	1.7 tons	1.4 tons	1.0 tons
3-1/2	1-1/8	1.2	2.1	1.7	1.2
3-3/4	1-1/4	1.35	2.3	1.9	1.35
4	1-5/16	1.5	2.6	2.1	1.5
4-1/2	1-1/2	1.8	3.1	2.5	1.8
5	1-5/8	2.25	3.9	3.2	2.25
5-1/2	1-3/4	2.6	4.5	3.7	2.6
6	2	3.1	5.4	4.4	3.1
6-1/2	2-1/8	3.6	6.2	5.1	3.6

TABLE G-2
RATED CAPACITIES FOR IMPROVED PLOW
STEEL, INDEPENDENT WIRE ROPE CORE,
WIRE ROPE AND WIRE ROPE SLINGS
(in tons of 2000 pounds)

Rope Dia. Inches	SINGLE LEG					
	Vertical			Choker		
	A	B	C	A	B	C
6X19 CLASSIFICATION						
1/4"	.59	.56	.53	.44	.42	.40
3/8"	1.3	1.2	1.1	.98	.93	.86
1/2"	2.3	2.2	2.0	1.7	1.6	1.5
5/8"	3.6	3.4	3.0	2.7	2.5	2.2
3/4"	5.1	4.9	4.2	3.8	3.6	3.1
7/8"	6.9	6.6	5.5	5.2	4.9	4.1
1"	9.0	8.5	7.2	6.7	6.4	5.4
1- 1/8"	11.0	10.0	9.0	8.5	7.8	6.8
6X37 CLASSIFICATION						
1- 1/4"	13.	12.	10.	9.9	9.2	7.9
1- 3/8"	16.	15.	13.	12.	11.	9.6
1- 1/2"	19.	17.	15.	14.	13.	11.
1- 3/4"	26.	24.	20.	19.	18.	15.
2"	33.	30.	26.	25.	23.	20.
2- 1/4"	41.	38.	33.	31.	29.	25.

(A) - Socket or swaged terminal attachment.
 (B) - Mechanical sleeve attachment.
 (C) - Hand tucked splice attachment.

TABLE G-3
RATED CAPACITIES FOR
IMPROVED PLOW STEEL,
INDEPENDENT WIRE ROPE CORE,
WIRE ROPE SLINGS
(in tons of 2000 pounds)

[Codification note: The graphic presentation of this table has been varied slightly in order that it would fall within the printing specifications for the Washington Administrative Code. The following table was too wide to be accommodated in the width of the WAC column. The table as codified has been divided into two tables covering the "TWO—LEG BRIDLE OR BASKET HITCH" for 6x19 Classification and for 6x37 Classification. Part One has Rope Diameter in Inches for Vertical and 60° within the two classifications. Part Two has Rope Diameter in Inches for 45° and 30° within the two classifications.]

TWO - LEG BRIDLE OR BASKET HITCH
(TABLE G-3: Part 1—Vertical and 60° Positions)

Rope Dia. Inches	SINGLE LEG					
	Vertical			60° 		
	A	B	C	A	B	C
6X19 CLASSIFICATION						
1/4"	1.2	1.1	1.0	1.0	.97	.92
3/8"	2.6	2.5	2.3	2.3	2.1	2.0
1/2"	4.6	4.4	3.9	4.0	3.8	3.4

5/8"	7.2	6.8	6.0	6.2	5.9	5.2
3/4"	10.	9.7	8.4	8.9	8.4	7.3
7/8"	14.	13.	11.	12.	11.	9.6
1"	18.	17.	14.	15.	15.	12.
1- 1/8"	23.	21.	18.	19.	18.	16.

6X37 CLASSIFICATION

1- 1/4"	26.	24.	21.	23.	21.	18.
1- 3/8"	32.	29.	25.	28.	25.	22.
1- 1/2"	38.	35.	30.	33.	30.	26.
1- 3/4"	51.	47.	41.	44.	41.	35.
2"	66.	61.	53.	57.	53.	46.
2- 1/4"	83.	76.	66.	72.	66.	57.

TWO - LEG BRIDLE OR BASKET HITCH
(TABLE G-3: Part 2—45° and 30° Positions)

Rope Dia. Inches	45° 			30° 		
	A	B	C	A	B	C
	6X19 CLASSIFICATION					
1/4"	.83	.79	.75	.59	.56	.53
3/8"	1.8	1.8	1.6	1.3	1.2	1.1
1/2"	3.2	3.1	2.8	2.3	2.2	2.0
5/8"	5.1	4.8	4.2	3.6	3.4	3.0
3/4"	7.2	6.9	5.9	5.1	4.9	4.2
7/8"	9.8	9.3	7.8	6.9	6.6	5.5
1"	13.	12.	10.	9.0	8.5	7.2
1- 1/8"	16.	15.	13.	11.	10.	9.0

6X37 CLASSIFICATION

1- 1/4"	19.	17.	15.	13.	12.	10.
1- 3/8"	22.	21.	18.	16.	15.	13.
1- 1/2"	27.	25.	21.	19.	17.	15.
1- 3/4"	36.	33.	29.	26.	24.	20.
2"	47.	43.	37.	33.	30.	26.
2- 1/4"	58.	54.	47.	41.	38.	33.

(A) - Socket or swaged terminal attachment.
 (B) - Mechanical sleeve attachment.
 (C) - Hand tucked splice attachment.

TABLE G-4
RATED CAPACITIES FOR
IMPROVED PLOW STEEL,
FIBER CORE, WIRE ROPE AND
WIRE ROPE SLINGS
(in tons of 2000 pounds)

Rope Dia. Inches	SINGLE LEG					
	Vertical			Choker		
	A	B	C	A	B	C
6X19 CLASSIFICATION						
1/4"	.55	.51	.49	.41	.38	.37
3/8"	1.2	1.1	1.1	.91	.85	.80
1/2"	2.1	2.0	1.8	1.6	1.5	1.4
5/8"	3.3	3.1	2.8	2.5	2.3	2.1
3/4"	4.8	4.4	3.9	3.6	3.3	2.9
7/8"	6.4	5.9	5.1	4.8	4.5	3.9

1	8.4	7.7	6.7	6.3	5.8	5.0
1- 1/8	10.	9.5	8.4	7.9	7.1	6.3

6X37 CLASSIFICATION

1- 1/4	12.	11.	9.8	9.2	8.3	7.4
1- 3/8	15.	13.	12.	11.	10.	8.9
1- 1/2	17.	16.	14.	13.	12.	10.
1- 3/4	24.	21.	19.	18.	16.	14.
2	31.	28.	25.	23.	21.	18.

- (A) - Socket or swaged terminal attachment.
- (B) - Mechanical sleeve attachment.
- (C) - Hand tucked splice attachment.

TABLE G-5

RATED CAPACITIES FOR IMPROVED PLOW
STEEL, FIBER CORE, WIRE ROPE SLINGS
(in tons of 2000 pounds)

[Codification note: The graphic presentation of this table has been varied slightly in order that it would fall within the printing specifications for the Washington Administrative Code. The following table was too wide to be accommodated in the width of the WAC column. The table as codified has been divided into two tables covering the "TWO - LEG BRIDLE OR BASKET HITCH" for 6x19 Classification and for 6x37 Classification. Part One has Rope Diameter in Inches for Vertical and 60° within the two classifications. Part Two has Rope Diameter in Inches for 45° and 30° within the two classifications.]

TWO - LEG BRIDLE OR BASKET HITCH
(TABLE G-5: Part 1—Vertical and 60° Positions)

Rope Dia. Inches	Vertical			60° 		
	A	B	C	A	B	C

6X19 CLASSIFICATION

1/4	1.1	1.0	.99	.95	.88	.85
3/8	2.4	2.2	1.9	2.1	1.9	1.8
1/2	4.3	3.9	3.7	3.7	3.4	3.2
5/8	6.7	6.2	5.6	5.8	5.3	4.8
3/4	9.5	8.8	7.8	8.2	7.6	6.8
7/8	13.	12.	10.	11.	10.	8.9
1	17.	15.	13.	14.	13.	11.
1- 1/8	21.	19.	17.	18.	16.	14.

6X37 CLASSIFICATION

1- 1/4	25.	22.	20.	21.	19.	17.
1- 3/8	30.	27.	24.	26.	23.	20.
1- 1/2	35.	23.	28.	30.	27.	24.
1- 3/4	48.	43.	38.	41.	37.	33.
2	62.	55.	49.	53.	48.	43.

TWO - LEG BRIDLE OR BASKET HITCH
(TABLE G-5: Part 2—45° and 30° Positions)

Rope Dia. Inches	45° 			30° 		
	A	B	C	A	B	C

6X19 CLASSIFICATION

1/4	.77	.72	.70	.55	.51	.49
3/8	1.7	1.6	1.5	1.2	1.1	1.1
1/2	3.0	2.8	2.6	2.1	2.0	1.8
5/8	4.7	4.4	4.0	3.3	3.1	2.8
3/4	6.7	6.2	5.5	4.8	4.4	3.9
7/8	9.1	8.4	7.3	6.4	5.9	5.1
1	12.	11.	9.4	8.4	7.7	6.7
1- 1/8	15.	13.	12.	10.	9.5	8.4

6X37 CLASSIFICATION

1-1/4	17.	16.	14.	12.	11.	9.8
1-3/8	21.	19.	17.	15.	13.	12.
1-1/2	25.	22.	20.	17.	16.	14.
1-3/4	34.	30.	27.	24.	21.	19.
2	43.	39.	35.	31.	28.	25.

- (A) - Socket or swaged terminal attachment.
- (B) - Mechanical sleeve attachment.
- (C) - Hand tucked splice attachment.

TABLE G-6

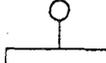
NUMBER AND SPACING OF U-BOLT WIRE
ROPE CLIPS

Improved plow steel rope diameter inches	Number of Clips		
	Drop forged	Other material	Minimum spacing (inches)
* .....	...	...	3
1/2	3	4	3 3/4
5/8	3	4	4 1/2
3/4	4	5	5 1/4
7/8	4	5	5 1/4
1	4	6	6
1 1/8	5	6	6 3/4
1 1/4	5	7	7 1/2
1 3/8	6	7	8 1/4
1 1/2	6	8	9

*Three clips shall be used on wire size less than 1/2-inch diameter.

TABLE G-7

WROUGHT IRON CHAIN
(in pounds or tons of 2000 pounds)

Nominal Size Chain Stock Inch	Single Leg	60° 	45° 	30° 
				
* 1/4	1060	1835	1500	1060
* 5/16	1655	2865	2340	1655

3/8	2385	2.1	3370	2385
* 7/16	3250	2.8	2.3	3250
1/2	12.1	13.7	13.0	12.1
* 9/16	12.7	14.6	13.8	12.7
5/8	13.3	15.7	14.7	13.3
3/4	14.8	18.3	16.7	14.8
7/8	16.5	11.2	19.2	16.5
1	18.5	14.7	12.0	18.5
1- 1/8	10.0	17.3	14.2	10.0
1- 1/4	12.4	21.4	17.5	12.4
1- 3/8	15.0	25.9	21.1	15.0
1- 1/2	17.8	30.8	25.2	17.8
1- 5/8	20.9	36.2	29.5	20.9
1- 3/4	24.2	42.0	34.3	24.2
1- 7/8	27.6	47.9	39.1	27.6
2	31.6	54.8	44.8	31.6

*These sizes of wrought iron chain are no longer manufactured in the United States.

TABLE G-8

ALLOY STEEL CHAIN
(in tons of 2000 pounds)

Nominal Size Chain Stock Inch	Single Leg	60°	45°	30°
1/4	1.62	2.82	2.27	1.62
3/8	3.30	5.70	4.65	3.30
1/2	5.62	9.75	7.90	5.62
5/8	8.25	14.25	11.65	8.25
3/4	11.5	19.9	16.2	11.5
7/8	14.3	24.9	20.3	14.3
1	19.3	33.4	27.3	19.8
1- 1/8	22.2	38.5	31.5	22.2
1- 1/4	28.7	49.7	40.5	28.7
1- 3/8	33.5	58.0	47.0	33.5
1- 1/2	39.7	68.5	56.0	39.7
1- 5/8	42.5	73.5	59.5	42.5
1- 3/4	47.0	81.5	62.0	47.0

TABLE G-9

MAXIMUM ALLOWABLE WEAR AT ANY POINT OF LINK

Chain size in inches	Maximum allowable wear in fraction of inches
1/4 (9/32)	3/64
3/8	5/64
1/2	7/64
5/8	9/64
3/4	5/32
7/8	1 1/64
1	3/16
1 1/8	7/32
1 1/4	1/4
1 3/8	9/32
1 1/2	5/16
1 3/4	1 1/32

TABLE G-10

SAFE WORKING LOADS FOR SHACKLES
(in tons of 2,000 pounds)

Material size (inches)	Pin diameter (inches)	Safe working load
1/2	5/8	1.4
5/8	3/4	2.2
3/4	7/8	3.2
7/8	1	4.3
1	1 1/8	5.6
1 1/8	1 1/4	6.7
1 1/4	1 3/8	8.2
1 3/8	1 1/2	10.0
1 1/2	1 5/8	11.9
1 3/4	2	16.2
2	2 1/4	21.2

TABLE I-1

FILTER LENSES FOR PROTECTION AGAINST RADIANT ENERGY

Operation	Shade No.
Soldering	2
Torch brazing	3 or 4
Light cutting, up to 1 inch	3 or 4
Medium cutting, 1-6 inches	4 or 5
Light gas welding, up to 1/8 inch	4 or 5
Medium gas welding 1/8-1/2 inch	5 or 6
Heavy gas welding, over 1/2 inch	6 or 8
Shielded metal-arc welding 1/16- to 5/32-inch electrodes	10
Inert-gas metal-arc welding (nonferrous) 1/16- to 5/32-inch electrodes	11
Inert-gas metal-arc welding (ferrous) 1/16- to 5/32-inch electrodes	12
Shielded metal-arc welding: 3/16- to 1/4-inch electrodes	12
5/16- and 3/8-inch electrodes	14
Atomic hydrogen welding	10 to 14
Carbon arc welding	14

[Order 74-25, § 296-304-07013, filed 5/7/74.]

WAC 296-304-080 Tools and related equipment—Scope and application. All sections of this chapter which include WAC 296-304-080 in the section number apply to tools and related equipment.

[Order 74-25, § 296-304-080, filed 5/7/74.]

WAC 296-304-08001 General precautions. (1) Hand lines, slings, tackles of adequate strength, or carriers such as tool bags with shoulder straps shall be provided and used to handle tools, materials, and equipment so that employees will have their hands free when using ship's ladders and access ladders. The use of hose or electric cords for this purpose is prohibited.

(2) When air tools of the reciprocating type are not in use, the discs and tools shall be removed.

(3) All portable, power-driven circular saws shall be equipped with guards above and below the base plate or shoe. The upper guard shall cover the saw to the depth of the teeth, except for the minimum arc required to permit the base to be tilted for bevel cuts. The lower guard shall cover

the saw to the depth of the teeth, except for the minimum arc required to allow proper retraction and contact with the work. When the tool is withdrawn from the work, the lower guard shall automatically and instantly return to the covering position.

(4) The moving parts of machinery on dry docks shall be guarded.

(5) Before use, pneumatic tools shall be secured to the extension hose or whip by some positive means to prevent the tool from becoming accidentally disconnected from the whip.

(6) The moving parts of drive mechanisms, such as gearing and belting on large portable tools, shall be adequately guarded.

(7) Headers, manifolds, and widely spaced hose connections on compressed air lines shall bear the word "air" in letters at least 1 inch high, which shall be painted either on the manifold or separate hose connections, or on signs permanently attached to the manifolds or connections. Grouped air connections may be marked in one location.

(8) Before use, compressed air hose shall be examined. Visibly damaged and unsafe hose shall not be used.

[Order 76-7, § 296-304-08001, filed 3/1/76; Order 74-25, § 296-304-08001, filed 5/7/74.]

WAC 296-304-08003 Portable electric tools. (1) The frames of portable electric tools and appliances, except double insulated tools approved by Underwriters' Laboratories, shall be grounded either through a third wire in the cable containing the circuit conductors or through a separate wire which is grounded at the source of the current.

(2) Grounding circuits, other than by means of the structure of the vessel on which the tool is being used, shall be checked to ensure that the circuit between the ground and the grounded power conductor has resistance which is low enough to permit sufficient current to flow to cause the fuse or circuit breaker to interrupt the current.

(3) Portable electric tools which are held in the hand shall be equipped with switches of a type which must be manually held in the closed position.

(4) Worn or frayed electric cables shall not be used.

(5) The employer shall notify the officer in charge of the vessel before using electric power tools operated with the vessel's current.

[Order 74-25, § 296-304-08003, filed 5/7/74.]

WAC 296-304-08005 Hand tools. (1) Employers shall not issue or permit the use of unsafe hand tools.

(2) Wrenches, including crescent, pipe, end and socket wrenches, shall not be used when jaws are sprung to the point that slippage occurs.

(3) Impact tools, such as drift pins, wedges, and chisels, shall be kept free of mushroomed heads.

(4) The wooden handles of tools shall be kept free of splinters or cracks and shall be kept tight in the tool.

[Order 74-25, § 296-304-08005, filed 5/7/74.]

WAC 296-304-08007 Abrasive wheels. (1) Floor stand and bench mounted abrasive wheels used for external grinding shall be provided with safety guards (protection

hoods). The maximum angular exposure of the grinding wheel periphery and sides shall be not more than 90 degrees, except that when work requires contact with the wheel below the horizontal plane of the spindle, the angular exposure shall not exceed 125 degrees. In either case the exposure shall begin not more than 65 degrees above the horizontal plane of the spindle. Safety guards shall be strong enough to withstand the effect of a bursting wheel.

(2) Floor and bench mounted grinders shall be provided with work rests which are rigidly supported and readily adjustable. Such work rests shall be kept a distance not to exceed 1/8 inch from the surface of the wheel.

(3) Cup type wheels use for external grinding shall be protected by either a revolving cup guard or a band type guard in accordance with the provisions of the United States of American Standard Safety Code for the Use, Care, and Protection of Abrasive Wheels, B7.1.1970. All other portable abrasive wheels used for external grinding shall be provided with safety guards (protection hoods) meeting the requirements of (5) of this section, except as follows:

(a) When the work location makes it impossible, in which case a wheel equipped with safety flanges as described in (6) of this section shall be used.

(b) When wheels 2 inches or less in diameter which are securely mounted on the end of a steel mandrel are used.

(4) Portable abrasive wheels used for internal grinding shall be provided with safety flanges (protection flanges) meeting the requirements of (6) of this section, except as follows:

(a) When wheels 2 inches or less in diameter which are securely mounted on the end of a steel mandrel are used.

(b) If the wheel is entirely within the work being ground while in use.

(5) When safety guards are required, they shall be so mounted as to maintain proper alignment with the wheel, and the guard and its fastenings shall be of sufficient strength to retain fragments of the wheel in case of accidental breakage. The maximum angular exposure of the grinding wheel periphery and sides shall not exceed 180 degrees.

(6) When safety flanges are required, they shall be used only with wheels designed to fit the flanges. Only safety flanges of a type and design and properly assembled so as to insure that the pieces of the wheel will be retained in case of accidental breakage shall be used.

(7) All abrasive wheels shall be closely inspected and ring tested before mounting to ensure that they are free from cracks or defects.

(8) Grinding wheels shall fit freely on the spindle and shall not be forced on. The spindle nut shall be tightened only enough to hold the wheel in place.

(9) The power supply shall be sufficient to maintain the rated spindle speed under all conditions of normal grinding. The rated maximum speed of the wheel shall not be exceeded.

(10) All employees using abrasive wheels shall be protected by eye protection equipment in accordance with requirements of WAC 296-304-09001 (1) and (2), except when adequate eye protection is afforded by eye shields which are permanently attached to the bench or floor stand.

[Order 74-25, § 296-304-08007, filed 5/7/74.]

WAC 296-304-08009 Powder actuated fastening tools. Powder actuated fastening tool operators shall comply with; and tools shall be designed, constructed, maintained and used in accordance with the requirements specified in chapter 296-24 WAC, Part H-1, general safety and health standards.

[Statutory Authority: Chapter 49.17 RCW. 95-04-006, § 296-304-08009, filed 1/18/95, effective 3/10/95; Order 76-7, § 296-304-08009, filed 3/1/76; Order 74-25, § 296-304-08009, filed 5/7/74.]

WAC 296-304-08011 Internal combustion engines, other than ship's equipment. (1) When internal combustion engines, furnished by the employer are used in a fixed position below decks, for such purposes as driving pumps, generators, and blowers, the exhaust shall be led to the open air, clear of any ventilation intakes and openings through which it might enter the vessel

(2) All exhaust line joints and connections shall be checked for tightness immediately upon starting the engine, and any leaks shall be corrected at once.

(3) When internal combustion engines on vehicles, such as forklifts and mobile cranes, or on portable equipment such as fans, generators, and pumps exhaust into the atmosphere below decks, the competent person shall make tests of the carbon monoxide content of the atmosphere as frequently as conditions require to ensure that dangerous concentrations do not develop. Employees shall be removed from the compartment involved when the carbon monoxide concentration exceeds 50 parts per million (0.005%). The employer shall use blowers sufficient in size and number and so arranged as to maintain the concentration below this allowable limit before work is resumed.

[Order 74-25, § 296-304-08011, filed 5/7/74.]

WAC 296-304-090 Personal protective equipment—Scope and application. All sections of this chapter which include WAC 296-304-090 in the section number apply to personal protective equipment.

[Order 74-25, § 296-304-090, filed 5/7/74.]

WAC 296-304-09001 Eye protection. (1) General precautions.

(a) All eye protection equipment required by these regulations shall meet the specifications prescribed by the American Standard Safety Code for Head, Eye and Respiratory Protection, Z2.1.

(b) Eye protection equipment shall be maintained in good condition.

(c) Eye protection equipment which has previously been used shall be cleaned and disinfected before it is issued by the employer to another employee.

(d) Employees who wear corrective spectacles while engaged in eye hazardous work shall be protected by eye protection equipment of a type which can be worn over personal spectacles, except that glasses with prescription ground safety lenses may be worn in lieu of cover goggles when such glasses provide suitable protection against the hazard involved.

(2) Protection against impact.

(i) In any operations such as chipping, caulking, drilling, riveting, grinding, and pouring babbitt metal, in which the

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eye hazard of flying particles, molten metal, or liquid chemical exists, employees shall be protected by suitable face shields or goggles meeting the requirements of (1) of this section.

(3) Protection against radiant energy.

(a) In any operation in which the eye hazard of injurious light rays or other radiant energy exists, depending upon the intensity of the radiation to which employees are exposed, they shall be protected by spectacles, cup goggles, helmets, hand shields, or face shields equipped with filter lenses meeting the requirements of (1) and (3)(b) of this section.

(b) Filter lenses shall be of a shade number appropriate to the type of work to be performed as indicated in Table I-1 in WAC 296-304-07011, except that variations of one or two shade numbers are permissible to suit individual preferences.

(c) If filter lenses are used in the goggles worn under the helmet, the shade number of the lens in the helmet may be reduced so that the sum of the shade numbers of the two lenses will equal the value shown in Table I-1 in WAC 296-304-07011.

[Order 76-7, § 296-304-09001, filed 3/1/76; Order 74-25, § 296-304-09001, filed 5/7/74.]

WAC 296-304-09003 Respiratory protection. The respiratory protection requirements of the general occupational health standards, chapter 296-62 WAC Part E, shall apply.

[Statutory Authority: Chapter 49.17 RCW. 93-19-142 (Order 93-04), § 296-304-09003, filed 9/22/93, effective 11/1/93. Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-304-09003, filed 11/30/83; Order 74-25, § 296-304-09003, filed 5/7/74.]

WAC 296-304-09005 Head, foot and body protection. (1) When employees are working in areas where there is danger of falling objects they shall be protected by protective hats.

(2) Protective hats shall meet the specifications contained in the United States of America Standard Safety Code for Head, Eye, and Respiratory Protection, Z89.1-1969. Hats without dielectric strength shall not be used where there is the possibility of contact with electric conductors.

(3) Protective hats which have been previously worn shall be cleaned and disinfected before they are issued by the employer to another employee.

(4) The employer shall arrange through means, such as vendors or local stores, or otherwise, to make safety shoes readily available to all employees, and shall encourage their use. Metal toe caps from which the covering has been worn shall be insulated when employees are working on exposed energized circuits of the vessel's electrical systems.

(5) Employees shall not be permitted to wear excessively greasy clothing when performing hot work operations.

(6) Employees shall be protected by suitable gloves when engaged in operations hazardous to their hands.

[Order 74-25, § 296-304-09005, filed 5/7/74.]

WAC 296-304-09007 Lifesaving equipment. (1) Personal flotation devices.

(a) Any personal flotation device shall be approved by the U.S. Coast Guard as a Type I PFD, Type II PFD, Type III PFD, or Type V PFD, or their equivalent, pursuant to 46

CFR 160 (Coast Guard Table of Devices Equivalent to Personal Flotation Devices.)

(b) Prior to each use, personal flotation devices shall be inspected for dry rot, chemical damage, or other defects which may affect their strength and buoyancy. Defective personal flotation devices shall not be used.

(2) Safety belts and lifelines.

(a) Safety belts shall be equipped with lifelines which in use are secured with a minimum of slack to a fixed structure.

(b) Prior to each use, belts and lifelines shall be inspected for dry rot, chemical damage, or other defects which may affect their strength. Defective belts and lifelines shall not be used.

(c) When employees are working in any location requiring a safety belt and a lifeline, care shall be exercised to ensure that the lifeline is not cut, pinched, or led over a sharp edge. In hot work operations or those involving the use of acids, solvents, or caustics, the line shall be kept clear to avoid its being burned or weakened. In order to keep the lifeline continuously attached with a minimum of slack to a fixed structure the attachment point of the lifeline shall be appropriately changed as the work progresses.

(3) Life rings and ladders.

(a) At least three 30 inch Coast Guard approved life rings with lines attached shall be kept in easily visible and readily accessible places aboard each vessel afloat on which work is being performed. Life rings shall be located, one forward, one aft, and one on the gangway, except on vessels under 200 feet in length, in which case one at the gangway will be sufficient.

(b) At least one life ring with a line attached shall be located on each staging float alongside a vessel on which work is being performed.

(c) At least 90 feet of line shall be attached to each life ring. Life rings and lines shall be maintained in good condition.

(d) In the vicinity of each vessel afloat on which work is being performed there shall be at least one portable or permanent ladder of sufficient length to assist employees to reach safety in the event that they fall into the water.

[Order 76-7, § 296-304-09007, filed 3/1/76; Order 74-25, § 296-304-09007, filed 5/7/74.]

WAC 296-304-100 Ship's machinery and piping systems—Scope and application. All sections of this chapter which include WAC 296-304-100 in this section number apply to ship's machinery and piping systems and sections WAC 296-304-10001 to 296-304-10007 apply only to shipbuilding and ship repairing.

[Order 74-25, § 296-304-100, filed 5/7/74.]

WAC 296-304-10001 Ship's boilers. (1) Before work is performed in the fire, steam, or water spaces of a boiler where employees may be subject to injury from the direct escape of a high temperature medium, such as steam, or water, oil, or other medium at a high temperature entering from an interconnecting system, the employer shall insure that the following steps are taken:

(a) The isolation and shutoff valves connecting the dead boiler with the live system or systems shall be secured,

blanked, and tagged indicating that employees are working in the boiler. This tag shall not be removed nor the valves unblanked until it is determined that this may be done without creating a hazard to the employees working in the boiler, or until the work in the boiler is completed. Where valves are welded instead of bolted at least two isolation and shutoff valves connecting the dead boiler with the live system or systems shall be secured, locked and tagged.

(b) Drain connections to atmosphere on all of the dead interconnecting systems shall be opened for visual observation of drainage.

(d) A warning sign calling attention to the fact that employees are working in the boilers shall be hung in a conspicuous location in the engine room. This sign shall not be removed until it is determined that the work is completed and all employees are out of the boilers.

[Order 74-25, § 296-304-10001, filed 5/7/74.]

WAC 296-304-10003 Ship's piping systems. (1) Before work is performed on a valve, fitting, or section of piping in a piping system where employees may be subject to injury from the direct escape of steam, or water, oil, or other medium at a high temperature, the employer shall insure that the following steps are taken:

(a) The isolation and shutoff valves connecting the dead system with the live system or systems shall be secured, blanked, and tagged indicating that employees are working on the systems. This tag shall not be removed nor the valves unblanked until it is determined that this may be done without creating a hazard to the employees working on the system, or until the work on the system is completed. Where valves are welded instead of bolted at least two isolation and shutoff valves connecting the dead system with the live system or systems shall be secured, locked, and tagged.

(b) Drain connections to atmosphere on all of the dead interconnecting systems shall be opened for visual observation of drainage.

[Order 74-25, § 296-304-10003, filed 5/7/74.]

WAC 296-304-10005 Ship's propulsion machinery. (1) Before work is performed on the main engine, reduction gear, or connecting accessories, the employer shall ensure that the following steps are taken:

(a) The jacking gear shall be engaged to prevent the main engine from turning over. A sign shall be posted at the throttle indicating that the jacking gear is engaged. This sign shall not be removed until the jacking gear can be safely disengaged.

(b) If the jacking gear is steam driven, the stop valves to the jacking gear shall be secured, locked, and tagged indicating that employees are working on the main engine.

(c) If the jacking gear is electrically driven, the circuit controlling the jacking gear shall be deenergized by tripping the circuit breaker, opening the switch or removing the fuse, whichever is appropriate. The breaker, switch, or fuse location shall be tagged indicating that employees are working on the main engine.

(2) Before the jacking engine is operated, the following precautions shall be taken:

(a) A check shall be made to ensure that all employees, equipment, and tools are clear of the engine, reduction gear, and its connecting accessories.

(b) A check shall be made to ensure that all employees, equipment and tools are free of the propeller.

(3) Before work is started on or in the immediate vicinity of the propeller, a warning sign calling attention to the fact that employees are working in that area shall be hung in a conspicuous location in the engine room. This sign shall not be removed until it is determined that the work is completed and all employees are free of the propeller.

(4) Before the main engine is turned over (e.g., when warming up before departure or testing after an overhaul) a check shall be made to ensure that all employees, equipment, and tools are free of the propeller.

[Order 76-7, § 296-304-10005, filed 3/1/76; Order 74-25, § 296-304-10005, filed 5/7/74.]

WAC 296-304-10007 Ship's deck machinery. (1) Before work is performed on the anchor windlass or any of its attached accessories, the employer shall ensure that the following steps are taken:

(a) The devil claws shall be made fast to the anchor chains.

(b) The riding pawls shall be in the engaged position.

(c) In the absence of devil claws and riding pawls, the anchor chains shall be secured to a suitable fixed structure of the vessel.

[Order 74-25, § 296-304-10007, filed 5/7/74.]

WAC 296-304-110 Portable, unfired pressure vessels, drums and containers, other than ship's equipment—Scope and application. All sections of this chapter which include WAC 296-304-110 in the section number apply to portable, unfired pressure vessels, drums and containers, other than ship's equipment and WAC 296-304-11001 to 296-304-11003 applies only to shipbuilding and ship repairing.

[Order 74-25, § 296-304-110, filed 5/7/74.]

WAC 296-304-11001 Portable air receivers and other unfired pressure vessels. (1) Portable, unfired pressure vessels, built after the effective date of this regulation, shall be marked and reported indicating that they have been designed and constructed to meet the standards of the American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section VIII, Rules for Construction of Unfired Pressure Vessels, 1963. They shall be subjected to a hydrostatic pressure test of one and one-half times the working pressure of the vessels.

(2) Portable, unfired pressure vessels, not built to the code requirements of (1) of this section, and built prior to the effective date of this regulation, shall be examined quarterly by a competent person, and approved by the state boiler inspecting division. They shall be subjected yearly to a hydrostatic pressure test of one and one-half times the working pressure of the vessels.

(3) The relief valves on the portable, unfired pressure vessels in (1) and (2) of this section shall be set to the safe

working pressure of the vessels, or set to the lowest safe working pressure of the systems, whichever is lower.

(4) A record of such examinations and tests made in compliance with the requirements of (1) and (2) of this section shall be maintained.

[Order 74-25, § 296-304-11001, filed 5/7/74.]

WAC 296-304-11003 Drums and containers. (1) Shipping drums and containers shall not be pressurized to remove their contents.

(2) A temporarily assembled pressurized piping system conveying hazardous liquids or gases shall be provided with a relief valve and by-pass to prevent rupture of the system and the escape of such hazardous liquids or gases.

(3) Pressure vessels, drums and containers containing toxic or flammable liquids or gases shall not be stored or used where they are subject to open flame, hot metal, or other sources of artificial heat.

(4) Unless pressure vessels, drums and containers of 30 gallon capacity or over containing flammable or toxic liquids or gases are placed in an out-of-the-way area where they will not be subject to physical injury from an outside source, barriers or guards shall be erected to protect them from such physical injury.

(5) Containers of 55 gallons or more capacity containing flammable or toxic liquid shall be surrounded by dikes or pans which enclose a volume equal to at least 25 percent of the total volume of the containers.

(6) Fire extinguishers adequate in number and suitable for the hazard shall be provided. These extinguishers shall be located in the immediate area where pressure vessels, drums and containers containing flammable liquids or gases are stored or in use. Such extinguishers shall be ready for use at all times.

[Order 74-25, § 296-304-11003, filed 5/7/74.]

WAC 296-304-120 Electrical machinery—Electrical circuits and distribution boards. (1) Before an employee is permitted to work on an electrical circuit, except when the circuit must remain energized for testing and adjusting, the circuit shall be deenergized and checked at the point at which the work is to be done to insure that it is actually deenergized. When testing or adjusting an energized circuit a rubber mat, duck board, or other suitable insulation shall be used underfoot where an insulated deck does not exist.

(2) Deenergizing the circuit shall be accomplished by opening the circuit breaker, opening the switch, or removing the fuse, whichever method is appropriate. The circuit breaker, switch, or fuse location shall be tagged to indicate that an employee is working on the circuit. Such tags shall not be removed nor the circuit energized until it is definitely determined that the work on the circuit has been completed.

(3) When work is performed immediately adjacent to an open-front energized board or in back of an energized board, the board shall be covered or some other equally safe means shall be used to prevent contact with any of the energized parts.

Note: WAC 296-304-120 is applicable only to shipbuilding and ship repairing.

[Order 74-25, § 296-304-120, filed 5/7/74.]

WAC 296-304-130 Gear certification—General provisions. All sections of this chapter which include WAC 296-304-130 in the section number apply to gear certification.

[Order 74-25, § 296-304-130, filed 5/7/74.]

WAC 296-304-13001 Purpose and scope. (1) The regulations in this part implement WAC 296-304-07001 through 296-304-07013. They provide procedures and standards governing accreditation of persons by the department of labor and industries, for the purpose of certifying shore-based material handling devices, and the manner in which such certification shall be performed.

(2) Accreditation is not required, and the regulations of this part are not applicable, under the following circumstances:

(a) Persons not required to be accredited for gear certification purposes, may, nevertheless, apply for and receive accreditation by the department of labor and industries. The appropriate portions of this section shall apply to persons accredited except insofar as exemptions may be granted.

[Order 74-25, § 296-304-13001, filed 5/7/74.]

WAC 296-304-13003 Definitions of terms. (1) "Vessel" means every description of watercraft or other artificial contrivance used or capable of being used, as a means of transportation on water, including special-purpose floating structures not primarily designed for or used as a means of transportation on water.

(2) Except as otherwise noted, "cargo gear," as used in WAC 296-304-140 through 296-304-17023, includes that gear forming a part of a vessel's equipment which is used for the handling of cargo other than bulk liquids, but does not include gear which is used only for handling or holding hoses, handling ships' stores, handling the gangway, or boom conveyor belt systems for the self-unloading of bulk cargo vessels.

(3) With reference to equipment covered by this section.

(a) "Derrick" means—

(i) When applied to vessels' cargo handling gear, a mechanical device for lifting, including a boom which is suspended at its head by a topping lift from a mast, king post, or similar structure, controlled in the horizontal plane by vangs, and used either singly or in pairs with married falls;

(ii) When applied to shore-based material handling devices, a mechanical device intended for lifting, with or without a boom supported at its head by a topping lift from a mast, fixed A frame, or similar structure. The mast or equivalent member may or may not be supported by guys or braces. The boom, where fitted, may or may not be controlled in the horizontal plane by guys (vangs). The term includes shear legs.

(b) "Crane" means a mechanical device intended for lifting or lowering a load and moving it horizontally, in which the hoisting mechanism is an integral part of the machine. A crane may be a fixed or mobile machine.

(c) "Bulk cargo spout" means a spout, which may or may not be telescopic and may or may not have removable sections, but is suspended over the vessel from some

overhead structure by wire rope or other means. Such a spout is often used with a "thrower" or "trimming machine." A grain loading spout is an example of those covered by this definition.

(d) "Bulk cargo sucker" means a pneumatic conveyor which utilizes a spout-like device, which may be adjustable vertically and/or laterally, and which is suspended over a vessel from some overhead structure by wire rope or other means. An example of an installation of this nature is the "grain sucker" used to discharge grain from barges.

(4) "Director" means the director of the department of labor and industries, or his authorized representative.

(5) "Bureau" means the Bureau of Labor Standards, U.S. Department of Labor.

(6) "Person" includes any individual, partnership, corporation, agency, association, or organization.

(7) "Competent person" means:

(a) An individual qualified to perform gear certification functions with respect to vessels' cargo handling gear, as specifically set forth in WAC 296-304-17023.

(b) An individual qualified under the provisions of WAC 296-304-180 through 296-304-18003 and 296-304-190 through 296-304-19001 to perform gear certification functions with respect to shore-based material handling devices.

(8) "Ton" means a ton of 2,240 pounds when applied to vessels' cargo handling gear, and a ton of 2,000 pounds when applied to shore-based material handling devices or to shore-type cranes permanently mounted aboard barges or other vessels employed in domestic trade and designed on the basis of the 2,000-pound ton. Capacity ratings may be stated in pounds.

(9) "Nondestructive" examination means examination of structure or parts by electronic, ultrasonic, or other nondestructive examination suitable for the purpose.

[Order 74-25, § 296-304-13003, filed 5/7/74.]

WAC 296-304-140 Procedure governing accreditation—Scope and application. All sections of this chapter which include WAC 296-304-140 in the section number apply to procedure governing accreditation.

[Order 74-25, § 296-304-140, filed 5/7/74.]

WAC 296-304-14001 Application for accreditation.

(1) Application. Any person seeking accreditation shall file an original and duplicate copy of an application for accreditation with the director of the department of labor and industries, on a form provided by the department of labor and industries, for this purpose. Each application shall be signed and certified by the applicant and, if the applicant is an agency or organization, by a responsible officer of such agency or organization.

(2) Contents of application. The application form shall include the following information:

(a) A statement detailing the applicable types of work performed by the applicant in the past, noting the amount and extent of such work performed within the previous three years, listing representative vessels involved, and including representative job orders if available, or equivalent evidence;

(b) Descriptive details concerning any testing instruments and heat treatment furnaces which are to be used in conducting required tests or heat treatments. Test reports

indicating that instruments meet the accuracy standards set forth in this section shall be included;

(c) A list setting forth the ports in which applicant currently conducts his business as well as those in which he proposes to conduct gear certification activities;

(d) A list of the applicant's responsible qualified personnel, both supervisory and managerial and including any surveyors, with resumes of their individual experience in the testing, examination, inspection and heat treatment of cargo gear. Such list shall include any branch office personnel or surveyors appointed to act in the applicant's behalf in any of the ports of the United States: *Provided, however,* That where the submission of individual resumes would be unduly burdensome because of the large number of persons engaged in the applicant's behalf, the applicant, after stating this fact, need only submit a list of its personnel together with a detailed statement of the qualifications upon which the appointment of surveyors is based;

(e) Names of at least three business references who will furnish information regarding work performed by the applicant;

(f) Any additional information the applicant deems to be pertinent.

[Order 74-25, § 296-304-14001, filed 5/7/74.]

WAC 296-304-14003 Action upon application. (1) Upon receipt of an application for accreditation, the director shall approve or deny the application. The director may conduct an investigation, which may include a hearing, prior to approving or denying an application. To the extent he deems appropriate, the director may provide an opportunity to other interested persons to present data and views on the application prior to approval or denial.

(2) Any application which fails to present the information required by the prescribed form may be returned to the applicant with a notation of deficiencies and without prejudice to submission of a new or revised application.

(3) If the application is approved, notice of approval shall be mailed to the applicant. If the application is denied, notice of such denial shall be mailed to the applicant and such denial shall be without prejudice to any subsequent application except where such action is deemed to be in the public interest. In the event an application is denied with prejudice, the provisions of WAC 296-304-14013 shall be applicable.

(4) A copy of the notice of accreditation shall be kept on file by applicant at the applicant's place of business.

[Order 74-25, § 296-304-14003, filed 5/7/74.]

WAC 296-304-14005 Duration and renewal of accreditation. The period of accreditation shall not exceed three years. Applications for renewal of accreditation shall be made on the same form as described in WAC 296-304-14001. No accreditation shall expire until action on an application for renewal shall have been finally determined: *Provided,* That such application has been properly executed in accordance with WAC 296-304-14001 and filed with and received by the director not less than 15 nor more than 60 days prior to the expiration date. A final determination means either the approval or initial denial of the application

for renewal. The procedure specified in WAC 296-304-14003 shall be applicable to all applications for renewal.

[Order 74-25, § 296-304-14005, filed 5/7/74.]

WAC 296-304-14007 Criteria governing accreditation to certificate vessels' cargo gear. (1) A person applying for accreditation to issue registers and pertinent certificates, to maintain registers and appropriate records, and to conduct initial, annual and quadrennial surveys, shall not be accredited unless he is engaged in one or more of the following activities:

(a) Classification of vessels;

(b) Certification of vessels' cargo gear;

(c) Shipbuilding or ship repairing, or both insofar as related to work on vessels' cargo handling gear;

(d) Unit and loose gear testing of vessels' cargo handling gear.

(2) Applicants for accreditation under WAC 296-304-14007(1) for operations in coastal or Great Lakes ports who come within WAC 296-304-14007 (1)(b) or (d) shall not be accredited unless they conduct at least 1,500 hours of cargo gear certification work per year.

(3) A person applying for accreditation to carry out tests of loose gear or wire rope, or both, or to carry out heat treatments, and to issue the related certificates, shall be engaged in one or both of the following activities:

(a) Testing of loose gear or wire rope, or both;

(b) Heat treatment of chains and loose cargo gear.

(4) A person applying for accreditation shall be staffed by individuals technically qualified to conduct the inspections and examinations and to conduct or supervise tests and heat treatments prescribed in this part. Any representatives, agents or surveyors acting on behalf of a person applying for accreditation in ports in which such operations are conducted shall be similarly qualified.

(a) Accreditation to conduct such nondestructive examination as may be a part of any certification activity may be granted to applicants found competent and equipped to carry out this activity.

(5) Except as noted in WAC 296-304-13501(3), and unless exemptions are granted under WAC 296-304-15001(8), a person applying for accreditation as specified in WAC 296-304-14007(1) shall be prepared to carry out all of the requirements of WAC 296-304-150 through 296-304-15005, 296-304-160 through 296-304-16025, and 296-304-170 through 296-304-17023 except that loose gear and wire rope tests and heat treatments may be carried out by the manufacturer of the gear concerned or by another person accredited specifically for this purpose.

(6) A person applying for accreditation shall have a satisfactory record of performance.

[Order 74-25, § 296-304-14007, filed 5/7/74.]

WAC 296-304-14009 Voluntary amendment or termination of accreditation. The accreditation of any person may be voluntarily amended or terminated upon written request filed with the director.

[Order 74-25, § 296-304-14009, filed 5/7/74.]

WAC 296-304-14011 Suspension or revocation of accreditation. The director may suspend or revoke an accreditation of any person for cause. Except in cases of willfulness or cases in which the public interest requires otherwise, before any accreditation is suspended or revoked facts or conduct which may warrant such action shall be called to the attention of the person involved in writing and that person shall be afforded an opportunity to achieve or demonstrate appropriate compliance.

[Order 74-25, § 296-304-14011, filed 5/7/74.]

WAC 296-304-14013 Reconsideration and review.

(1) Any person aggrieved by the action of the director or his authorized representative in denying, granting, suspending or revoking an accreditation under this section may within 15 days after such action, (a) file a written request for reconsideration thereof by the director or the authorized representative of the director who made the decision in the first instance, or (b) file a written request for review of the decision by the director or an authorized representative of the director, who has taken no part in the action which is the subject for review.

(2) A request for reconsideration shall be granted where the applicant shows that there is additional evidence which may materially affect the decision and that there were reasonable grounds for failure to adduce such evidence in the original proceedings.

(3) Any person aggrieved by the action of the director or authorized representative of the director in denying a request for reconsideration may, within 15 days after the denial of such request, file with the director or his authorized representative a written request for review.

(4) Any person aggrieved by the reconsidered determination of the director or authorized representative of the director, may within 15 days after such determination, file with the director a written request for review.

(5) A request for review shall be granted where reasonable grounds for the review are set forth in the request.

(6) If a request for reconsideration or review is granted, all interested persons shall be afforded an opportunity to present their views.

(7) No cargo gear certification function shall be performed by any person seeking reconsideration or review under this section pending the final decision with respect to such reconsideration or review.

[Order 74-25, § 296-304-14013, filed 5/7/74.]

WAC 296-304-150 Duties of persons accredited to certificate vessels' cargo gear—Scope and application. All sections of this chapter which include WAC 296-304-150 in the section number apply to duties of persons accredited to certificate vessels' cargo gear.

[Order 74-25, § 296-304-150, filed 5/7/74.]

WAC 296-304-15001 General duties—Exemptions.

(1) Except as noted in WAC 296-304-13501 and 296-304-15001(8), the requirements set forth in WAC 296-304-160 through 296-304-16025 and 296-304-170 through 296-304-17023 shall be strictly adhered to in all testing, examinations, inspections and heat treatments.

(2) Supervision of all testing, examinations, inspections, and heat treatments shall be carried out only by such persons as are listed in the application for accreditation or subsequent supplements thereto, submitted pursuant to this section.

(3) The certificates issued by an accredited person shall be signed and all register entries made only by an authorized agent of such accredited person. No certification shall be issued until any deficiencies considered by the accredited person to constitute a currently unsatisfactory condition have been corrected. Replacement parts shall be of equal or better quality as original equipment and suitable for the purpose. In the event deficiencies remain uncorrected and no certification may therefore be issued, the accredited person shall inform the nearest district office of the department of labor and industries of the circumstances.

(4) Dynamometers or other recording test equipment owned by an accredited person shall have been tested for accuracy within the six months next preceding application for accreditation or renewal of same. Such test shall be performed with calibrating equipment which has been checked in turn so that indications are traceable to the U.S. Bureau of Standards. A copy of test reports shall accompany the application. Where test equipment is not the property of the accredited person, that person shall not issue any certificate based upon the use of such equipment unless its owner has made available a certificate of accuracy based on the requirements of this section, obtained within 1 year prior to such use, and stating the errors of the equipment. Reasonable standards of accuracy shall be met and proof loads adjusted as necessary.

(5) An accredited person shall, upon request, provide the nearest local office of the department of labor and industries with advance information as to scheduled testing or of such other functions as are performed and facilitate the department of labor and industries observation of any such activities as it may desire to witness: *Provided, however,* That tests need not be delayed, except when specifically requested by the department of labor and industries under unusual circumstances.

(6) All cargo gear registers or certificates issued by an accredited person shall be made on forms prescribed or approved by the department of labor and industries.

(7) Unless otherwise instructed by the director in specific instances, any person accredited under WAC 296-304-14007(1) shall accept certificates relating to loose gear or wire rope tests or to heat treatments which are issued by the manufacturer of the gear concerned, by another person accredited specifically by the director for this purpose, or by any other person whose certificates are acceptable to the department of labor and industries. Such certificates shall either be attached as a part of the vessel's certification or shall be used as the basis for the issuance of the accredited person's own loose gear, wire rope, or heat treatment certificates. In the latter case, the original certificates shall be kept on file by the accredited person as part of the permanent record of the vessel concerned.

(8) In case of practical difficulties or unnecessary hardships, the director in his discretion may grant exemptions from any provision of WAC 296-304-150 through 296-304-15005, 296-304-160 through 296-304-16025 and 296-304-170 through 296-304-17023.

[Order 74-25, § 296-304-15001, filed 5/7/74.]

WAC 296-304-15003 Recordkeeping and related procedures concerning records in custody of accredited persons. (1) An accredited person shall maintain records of all work performed under WAC 296-304-160 through 296-304-16025 and 296-304-170 through 296-304-17023.

(2) An accredited person shall maintain a continuous record of the status of the certification of each vessel issued a register by such person.

(3) The records required in (1) and (2) of this section shall be available for examination by the director.

(4) When annual or quadrennial tests, inspections, examinations, or heat treatments are performed by an accredited person, other than the person who originally issued the vessel's register, such accredited person shall furnish copies of any certificates issued and information as to register entries to the person originally issuing the register.

(5) An accredited person shall inform the nearest local office of the department of labor and industries whenever a vessel is initially certificated under these regulations and a register in the prescribed form has been issued.

(6) A copy of each certificate relating to unit tests or thorough examinations, except those issued by the manufacturer and those issued by accredited persons outside of the United States, shall be sent to the nearest local office of the department of labor and industries within 10 days after issuance. Such records shall form a part of the department of labor and industries file on the accredited person.

(7) An accredited person shall promptly notify the nearest local office of the department of labor and industries with respect to any changes in technical personnel, in fee schedules in geographical areas in which operations are conducted, or other pertinent substantial changes in its organization or operations.

[Order 74-25, § 296-304-15003, filed 5/7/74.]

WAC 296-304-15005 Recordkeeping and related procedures concerning records in custody of the vessel.

(1) A fully completed and up-to-date register shall be kept in the form prescribed or approved by the department of labor and industries, giving the particulars required with respect to:

(a) The inspections and thorough examinations required by WAC 296-304-16005 (1) and (2).

(b) The thorough examinations required by WAC 296-304-16005(3).

(c) The thorough examinations required by WAC 296-304-16009.

(d) The heat treatment required by WAC 296-304-16007(1) and (2), and 296-304-16013.

(2) Certificates in the form prescribed or approved by the department of labor and industries shall be kept up-to-date, be attached to the register, and shall contain the particulars required with respect to:

(a) The testing and examinations required by WAC 296-304-16003, 296-304-16005(1) and 296-304-16013.

(b) The heat treatment required by WAC 296-304-16007 and 296-304-16013.

(3) The certificates and entries in the register shall be signed by a person qualified under WAC 296-304-17023.

(4) Adequate means shall be provided to enable persons examining the register, or any certificate attached thereto, to identify items of cargo gear referred to therein. Small items of gear, such as shackles, shall bear a mark to indicate that they have been initially tested.

(5) Records shall be kept aboard vessels identifying wire rope or articles of loose gear obtained from time to time and required to be certificated under the regulations of this section.

(6) An accredited person shall instruct the vessel's officers or the vessel's operator if the vessel is unmanned, that the vessel's register and certificates shall be preserved for at least 4 years after the date of the latest entry except in the case of nonrecurring test certificates concerning gear which is kept in use for a longer period, in which event the pertinent certificates shall be retained so long as that gear is continued in use.

(7) In cases where derricks, spouts, suckers, or cranes are mounted permanently aboard barges which remain in domestic inland waters service, the certification documentation shall comply with the provisions of WAC 296-304-20025.

[Order 74-25, § 296-304-15005, filed 5/7/74.]

WAC 296-304-160 Certification of vessels' cargo gear—Scope and application. All sections of this chapter which include WAC 296-304-160 in the section number apply to certification of vessels' cargo gear.

[Order 74-25, § 296-304-160, filed 5/7/74.]

WAC 296-304-16001 General. (1) Except as noted in WAC 296-304-13501 and as provided in exemptions under WAC 296-304-15001(9), certification performed by accredited persons shall conform to the requirements contained in this section.

(2) Safe working loads assigned to assembled units of gear shall be based on applicable design criteria acceptable to the accredited person. Where no design data on which to base a rating is obtainable, the safe working load ratings assigned shall be based on the owner's information and warranty that those so assigned are correct. Unit test certificates shall state the basis for any such safe working load assignment.

[Order 74-25, § 296-304-16001, filed 5/7/74.]

WAC 296-304-16003 Initial tests of cargo gear and tests after alterations, renewals or repairs. (1) Before being taken into use, hoisting machines, fixed gear aboard vessels accessory thereto, and loose gear and wire rope used in connection therewith, shall be tested and examined and the safe working load thereof certified in the manner set forth in WAC 296-304-170 through 296-304-17023.

(2) Replacement or additional loose gear and wire rope obtained from time to time shall also be tested and examined in the manner set forth in WAC 296-304-16003(1). However, the replacement of a component part of an article of loose gear, such as a sheave, pin, or bushing does not

require a new test certificate so long as the new component at least equals in all particulars the part replaced.

(3) In the case of untested gear which has been in use, an initial test in conformance with WAC 296-304-16003(1) shall be carried out: *Provided, however,* That existing standing rigging and wire rope will not be required to be tested but shall be thoroughly examined to ascertain its fitness for continued use in conformance with the requirements of WAC 296-304-16023 and 296-304-16025.

(4) In the case of important alterations or renewals of the machinery and gear and also after repairs due to failure of or damage to other than loose components, a test as required in WAC 296-304-16003(1) shall be carried out.

(5) If the operation in which cargo gear is engaged never utilizes more than a fraction of the safe working load rating, the owner may, at his option, have said gear certificated for, and limited in operation to, a lesser maximum safe working load: *Provided, however,* That the gear concerned is physically capable of operation at the original load rating and the load reduction is not for the purpose of avoiding correction of any deficiency.

(6) In no case shall safe working loads be increased beyond the original design limitations unless such increase is based on engineering calculations by or acceptable to the accredited certification agency, and all necessary structural changes are carried out.

[Order 74-25, § 296-304-16003, filed 5/7/74.]

WAC 296-304-16005 Periodic tests, examinations and inspections. After being taken into use, every hoisting machine, all fixed gear aboard vessels accessory thereto and loose gear used in connection therewith, shall be tested, thoroughly examined or inspected as follows:

(1) Derricks with their winches and accessory gear, including the attachments, as a unit; and cranes and other hoisting machines with their accessory gear, as a unit, shall be tested and thoroughly examined every four years in the manner set forth in WAC 296-304-170 through 296-304-17023.

(2) Derricks, their permanent attachments and any other fixed gear the dismantling of which is especially difficult shall be visually inspected every twelve months. In order to facilitate such inspection all derricks shall be lowered.

(3) All hoisting machines (e.g., cranes, winches), blocks, shackles, and all other accessory gear not included in WAC 296-304-16005(2), shall be thoroughly examined every twelve months by means of a visual examination, supplemented as necessary by other means, such as a hammer test or with electronic, ultrasonic, or other nondestructive methods, carried out as carefully as conditions permit in order to arrive at a reliable conclusion as to the safety of the parts examined. Particular attention shall be paid to the suitability for continued use of all swivels and the pins and bushing of blocks. If necessary, parts of the machines or gear shall be dismantled. If blocks are disassembled, all shell bolt nuts shall be securely locked upon reassembly.

(4) Where a derrick or crane is mounted on a barge hull and ballast tanks within the hull are used to facilitate use of the derrick or crane, or uncontrolled free surface may be a factor, each annual inspection or examination, as required, shall include such inspection as is necessary for the purpose

of determining the integrity of any internals contributing to stability under conditions of use. The owner shall provide the accredited person with necessary information on any ballasting arrangements required.

(5) Annual inspection or examination, as required, shall include, among other things, examination of the following:

(a) Derrick heel attachment points. Heel pins may, if possible, be examined by nondestructive examination.

(b) Shrouds and stays necessary in the use of the gear, together with attachment points.

(c) Deck fittings for the securing of vang, topping lifts, and/or preventers.

(d) Means of attachment to the hull of "A" frame or other fixed derrick or crane structure and of mobile types of equipment permanently placed aboard the barge or vessel.

(e) Clamshell buckets or other similar equipment, such as magnets, etc., used in conjunction with a derrick or crane mounted aboard a vessel, with particular attention to closing line wires and sheaves. The accredited person may supplement such examination by requesting any operational tests he may deem appropriate.

(f) Winch and other operating drums for excessive wear or defect.

[Order 74-25, § 296-304-16005, filed 5/7/74.]

WAC 296-304-16007 Heat treatment. (1) All chains (other than bridle chains attached to derricks or masts), rings, hooks, shackles, and swivels made of wrought iron, which are used in hoisting or lowering, shall be annealed in accordance with WAC 296-304-17021 at the following intervals:

(a) Half inch and smaller chains, rings, hooks, shackles, and swivels in general use, at least once every six months; and

(b) All other chains, rings, hooks, shackles, and swivels in general use, at least once every twelve months.

(c) In the case of gear used solely on lifting machinery worked by hand, twelve months shall be substituted for six months in WAC 296-304-16007 (1)(a) and two years for twelve months in WAC 296-304-16007 (1)(b).

(d) When used in this paragraph, the term "in general use" means used on fifty-two or more days in a year. In any case, however, the period between annealings shall not exceed two years.

(2) Chains, rings, hooks, shackles, and swivels made of material other than wrought iron or steel shall be heat treated when necessary in accordance with WAC 296-304-17021(2).

[Order 74-25, § 296-304-16007, filed 5/7/74.]

WAC 296-304-16009 Exemptions from heat treatment. Gear made of steel, or gear which contains (as in ball bearing swivels), or is permanently attached to (as with blocks), equipment made of materials which cannot be subjected to heat treatment, shall be exempt from the requirements of WAC 296-304-16007. Such gear, however, shall be thoroughly examined in the manner described in WAC 296-304-16005(3).

[Order 74-25, § 296-304-16009, filed 5/7/74.]

WAC 296-304-16011 Grace periods. Grace periods allowed in connection with the requirements of this section are as follows:

- (1) Annual or six-month requirements - by the end of the voyage during which they become due;
- (2) Quadrennial requirements - within six months after the date when due;
- (3) Grace periods shall not be deemed to extend subsequent due dates.

[Order 74-25, § 296-304-16011, filed 5/7/74.]

WAC 296-304-16013 Gear requiring welding. Chains or other gear which have been lengthened, altered or repaired by welding, shall be properly heat treated where necessary, and, before again being put into use, shall be tested and reexamined in the manner set forth in WAC 296-304-170 through 296-304-17023.

[Order 74-25, § 296-304-16013, filed 5/7/74.]

WAC 296-304-16015 Damaged components. (1) Pursuant to WAC 296-304-18003, any derrick or associated permanent fitting which is deformed in service between surveys shall be subjected to proof test to determine its suitability for continued service. If a proof test indicates that the derrick or associated permanent fitting may be continued in service without repair, a note of the existing deformity shall be made on the test certificate. When, in the opinion of the accredited person, it is unsafe to conduct a proof test with an existing deformity, the derrick or associated permanent fitting shall be replaced or repaired and then subjected to proof test in accordance with WAC 296-304-170 through 296-304-17023.

(2) Any loose gear components which are injured or deformed by a proof load shall be replaced before a certificate is issued.

(3) Any derrick, other fixed installation, or associated permanent fitting, which is injured or deformed by a proof load shall be replaced or repaired and another proof load test shall be conducted without damage before a certificate is issued.

[Order 74-25, § 296-304-16015, filed 5/7/74.]

WAC 296-304-16017 Marking and posting of safe working loads. (1) The safe working load of the assembled gear and the minimum angle to the horizontal at which this load may be applied shall be plainly marked at the heels of all booms along with the date of the test. Where gear is certificated for use in union purchase, the union purchase safe working load shall also be plainly marked. Any limitations shall be noted in the vessel's papers.

(2) The safe working load shall be marked on all blocks used in hoisting or lowering.

(3) When the capacity of the boom of a crane or derrick has been or will be rated in accordance with the variance of its radius, the maximum safe working loads for the various working angles of the boom and the maximum and minimum radius at which the boom may be safely used, shall be conspicuously posted near the controls and visible to the crane operator. Ratings may be stated in pounds. When

they are stated in tons of 2,000 pounds, this fact shall be indicated.

[Order 74-25, § 296-304-16017, filed 5/7/74.]

WAC 296-304-16019 Requirements governing braking devices and power sources. All types of winches and cranes shall be provided with means to stop and hold the proof load in any position, and the efficiency of such means shall be demonstrated. Electric winches, electrohydraulic winches fitted with electromagnetic or hydraulic brakes at the winch, or electric cranes, shall be equipped so that a failure of the electric power shall stop the motion and set the brakes without any action on the part of the operator. Current for operation of electric winches and cranes during the tests shall be taken from the vessel's circuits. Shore current may be used if it passes through the vessel's main switchboard.

[Order 74-25, § 296-304-16019, filed 5/7/74.]

WAC 296-304-16021 Means of derrick attachment. Appropriate measure shall be taken to prevent the foot of a derrick from being accidentally lifted from its socket or support during the test.

[Order 74-25, § 296-304-16021, filed 5/7/74.]

WAC 296-304-16023 Limitations on use of wire rope. (1) An eye splice made in any wire rope shall have at least three tucks with a whole strand of rope and two tucks with one-half of the wires cut out of each strand. However, this requirement shall not operate to preclude the use of another form of splice or connection which can be shown to be as efficient.

(2) Except for eye splices in the ends of wires, each wire rope used in hoisting or lowering, in guying derricks, or as a topping lift, preventer or pendant, shall consist of one continuous piece without knot or splice.

(3) Eyes in the ends of wire rope cargo falls shall not be formed by knots and, in single part falls, shall not be formed by wire rope clips.

(4) The ends of falls shall be secured to the winch drums by clamps, U-bolts, shackles or some other equally strong method. Fiber rope fastenings shall not be used.

(5) Wire rope shall not be used for the vessel's cargo gear if in any length of eight diameters, the total number of visible broken wires exceeds 10 percent of the total number of wires, or if the rope shows other signs of excessive wear, corrosion, or defect. Particular attention shall be given to the condition of those sections of wire rope adjacent to any terminal connections, those sections exposed to abnormal wear, and those sections not normally exposed for examination.

[Order 74-25, § 296-304-16023, filed 5/7/74.]

WAC 296-304-16025 Limitations on use of chains. Chains forming a part of vessel's cargo gear shall not be used when, due to stretch, the increase of length of a measured section exceeds five percent, when a link is damaged, or when other external defects are evident. Chains shall not be shortened by bolting, wiring, or knotting.

[Order 74-25, § 296-304-16025, filed 5/7/74.]

WAC 296-304-170 Certification of vessels—Tests and proof loads—Heat treatment—Competent persons—Scope and application. All sections of this chapter which include WAC 296-304-170 in the section number apply to certification of vessels: Tests and proof loads; heat treatment; competent persons.

[Order 74-25, § 296-304-170, filed 5/7/74.]

WAC 296-304-17001 Visual inspection before tests. Before any test under this WAC 296-304-170 through 296-304-17023 is carried out, a visual inspection of the gear involved shall be conducted and any visibly defective gear shall be replaced or repaired. The provisions of WAC 296-304-16005(4) shall be adhered to.

[Order 74-25, § 296-304-17001, filed 5/7/74.]

WAC 296-304-17003 Unit proof test—Winches, derricks and gear accessory thereto. (1) Winches, with the whole of the gear accessory thereto (including derricks, goosenecks, eye plates, eye bolts, or other attachments), shall be tested with a proof load which shall exceed the safe working load as follows:

Safe working load	Proof load
Up to 20 tons	25 percent in excess.
20-50 tons	5 tons in excess.
Over 50 tons	10 percent in excess.

(2) The proof load shall be lifted with the vessel's normal tackle with the derrick at an angle not more than 15 degrees to the horizontal, or, at the designed minimum angle when this is greater, or, when this is impracticable, at the lowest practicable angle. The angle at which the test was made shall be stated in the certificate of test. After the proof load has been lifted, it shall be swung as far as possible in both directions. In applying the proof load, the design factors of the gear concerned will determine whether the load is applied with a single part fall or with a purchase and the certificate of test shall state the means used. Where winches are fitted with mechanical brakes for manual operation they shall be demonstrated to be in satisfactory operating condition.

(3) In the case of heavy lift derrick barges, proof loads shall be applied, except as limited by design and stability considerations, at the maximum and minimum radius for which designed, as well as at any intermediate radius which the surveyor may deem necessary, and shall be swung as far as possible in both directions. Data with respect to each proof load applied shall be entered in the test certificate.

(4) No items of cargo gear furnished by outside sources shall be used as a part of the vessel's gear for the purpose of accomplishing the proof test.

(5) All tests prescribed by this section should in general be carried out by dead load, except that in the case of quadrennial tests, replacements, or renewals, spring or hydraulic balances may be used where dead loads are not reasonably available. However, no exception shall be allowed in the case of gear on new vessels.

(6) The test shall not be regarded as satisfactory unless the indicator remains constant under the proof load for a period of at least 5 minutes.

(7) The safe working load, determined pursuant to the requirements of this section, shall be applicable only to a swinging derrick. When using two fixed derricks in "union purchase" rigs, the safe working load should generally be reduced. It is recommended that owners obtain union purchase safe working load certification based upon design study and analysis by, or acceptable to, a qualified technical office of an accredited gear certification agency, with the recognition that such determinations are valid only for the conditions contemplated in the analysis.

(a) Where both guys and preventers are fitted, union purchase certification shall state whether the guy or the preventer is the working strength member, when the guy is for slewing only, and when the guy and preventor should share working loads as far as practicable.

(8) When necessary in the proof testing of heavy derricks, the appropriate shrouds and stays shall be rigged.

[Order 74-25, § 296-304-17003, filed 5/7/74.]

WAC 296-304-17005 Unit proof tests—Cranes and gear accessory thereto. (1) Except as noted in WAC 296-304-17005(5), cranes and other hoisting machines, together with gear accessory thereto, shall be tested with a proof load which shall exceed the safe working load as follows:

Safe working load	Proof load
Up to 20 tons	25 percent in excess.
20-50 tons	5 tons in excess.
Over 50 tons	10 percent in excess.

(2) The proof load shall be lifted and swung as far as possible in both directions. If the jib or boom of the crane has a variable radius, it shall be tested with proof loads, as specified in WAC 296-304-17005(1), at the maximum and minimum radius. In the case of hydraulic cranes, when owing to the limitation of pressure it is impossible to lift a load 25 percent in excess of the safe working load, it will be sufficient to lift the greatest possible load.

(3) Initial proof tests of new cranes shall be made only with a dead load as specified in WAC 296-304-17005(2).

(4) Initial tests of cranes which have been in service, quadrennial tests, or tests associated with replacements or renewals, may be made with spring or hydraulic balances where dead loads are not reasonably available, under the following conditions:

(a) Tests shall be conducted at maximum, minimum, and intermediate radius points, as well as such points in the arc of rotation as meet with the approval of the accredited person.

(b) An additional test shall be conducted with partial load and shall include all functions and movements contemplated in the use of the crane.

(5) In cases where shore-type cranes are mounted permanently aboard barges, the requirements of WAC 296-304-170 through 296-304-17023 with respect to unit proof tests and examinations shall not apply and the applicable requirements of WAC 296-304-200 through 296-304-20025 shall be adhered to with respect to unit proof tests and examinations.

[Order 74-25, § 296-304-17005, filed 5/7/74.]

WAC 296-304-17007 Limitations on safe working loads and proof loads. The proof loads specified in WAC 296-304-17003 and 296-304-17005 shall be adjusted as necessary to meet any pertinent limitations based on stability and/or on structural competence at particular radii. Safe working loads shall be reduced accordingly.

[Order 74-25, § 296-304-17007, filed 5/7/74.]

WAC 296-304-17009 Examinations subsequent to unit tests. (1) After satisfactory completion of the unit proof load tests required by WAC 296-304-17003 and 296-304-17005, the cargo gear and all component parts thereof shall be given a thorough visual examination, supplemented as necessary by other means, such as a hammer test or with electronic, ultrasonic, or other nondestructive methods, to determine if any of the parts were damaged, deformed, or otherwise rendered unsafe for further use.

(2) When the test of gear referred to in WAC 296-304-17008(1) is being conducted for the first time on a vessel, accessory gear shall be dismantled or disassembled for examination after the test. The sheaves and pins of the blocks included in this test need not be removed unless there is evidence of deformation or failure.

(3) For subsequent tests such parts of the gear shall be dismantled or disassembled after the test as necessary to determine their suitability for continued service.

(4) When blocks are disassembled all shell bolt nuts shall be securely locked upon reassembly.

(5) In carrying out the requirements of this section, replacement shall be required of:

(a) Any swivel found to have excessive tolerance as a result of wear on any bearing surface.

(b) Pins of blocks found to be shouldered, notched, or grooved from wear, in which case, in addition to replacing the pin, sheave bushings shall be examined for suitability for continued use.

[Order 74-25, § 296-304-17009, filed 5/7/74.]

WAC 296-304-17011 Proof tests—Loose gear. (1) Chains, rings, shackles and other loose gear (whether accessory to a machine or not) shall be tested with a proof load equal to that shown against the article in the following table:

Article of gear	Proof load
Chain, ring, hook, shackle or swivel	100 percent in excess of the safe working load.
Blocks:	
Single sheave block	300 percent in excess of the safe working load. ¹
Multiple sheave block with safe working load up to and including 20 tons	100 percent in excess of the safe working load.

Multiple sheave block with safe working load over 20 tons up to and including 40 tons 20 tons in excess of the safe working load.

Multiple sheave block with safe working load over 40 tons 50 percent in excess of the safe working load.

Pitched chains used with hand-operated blocks and rings, hooks, shackles or swivels permanently attached thereto 50 percent in excess of the safe working load.

Hand-operated blocks used with pitched chains and rings, hooks, shackles or swivels permanently attached thereto 50 percent in excess of the safe working load.

¹The proof load applied to the block is equivalent to twice the maximum resultant load on the eye or pin of the block when lifting the nominal safe working load defined in WAC 296-304-17011 (1)(a) below. The proof load is, therefore, equal to four times the safe working load as defined in WAC 296-304-17011 (1)(a) below or twice the safe working load as defined in WAC 296-304-17011 (1)(b) below.

(a) The nominal safe working load of a single-sheave block should be the maximum load which can be safely lifted by the block when the load is attached to a rope which passes around the sheave of the block.

(b) In the case of a single-sheave block where the load is attached directly to the block instead of to a rope passing around the sheave, it is permissible to lift a load equal to twice the nominal safe working load of the block as defined in WAC 296-304-17011 (1)(a) above.

(c) In the case of a lead block so situated that an acute angle cannot be formed by the two parts of the rope passing over it (i.e., the angle is always 90° or more), the block need not have a greater nominal safe working load than one-half the maximum resultant load which can be placed upon it.

(2) In cases where persons accredited to carry out loose gear tests may be retained to conduct tests of special stevedoring gear as described in WAC 296-56-45001(2), which does not form part of a vessel's equipment, such tests shall adhere to the requirements set forth in WAC 296-56-45001 (2)(a), (b) and (c).

(3) After being tested as required by WAC 296-304-17011(1), and before being taken into use, all chains, rings, hooks, shackles, blocks or other loose gear, except as noted in WAC 296-304-17013, shall be thoroughly examined, the sheaves and pins of the blocks being removed for this purpose, to determine whether any part has been injured or permanently deformed by the test. Shell bolt nuts shall be securely locked upon reassembly. Defective loose gear components shall be replaced before the certificate is issued.

(4) Any certificate relating to shackles, swivels or strength members of single-sheave blocks which have been restored to original dimensions by welding shall state this fact.

[Order 74-25, § 296-304-17011, filed 5/7/74.]

WAC 296-304-17013 Specially designed blocks and components. (1) Blocks and connecting components of an unusual nature which are specially designed and constructed as an integral part of a particular lifting unit and are either permanently affixed or of such design that two or more components must be tested together need not be considered as loose gear for purposes of WAC 296-304-17011.

(2) In lieu of the loose gear proof test required by WAC 296-304-17011(1), design data shall be submitted to an accredited certification agency indicating design and material specifications and analysis whereby the designed strength of such gear may be determined.

(3) Subsequent to the test of the lifting unit as a whole, a thorough visual examination shall be made of disassembled parts and an electronic, ultrasonic, or other equally efficient nondestructive examination shall be made of those parts not dismantled to ensure the safe condition of such parts.

[Order 74-25, § 296-304-17013, filed 5/7/74.]

WAC 296-304-17015 Proof tests—Wire rope. Wire rope, except as provided in WAC 296-304-16003(2), shall be tested by sample, a piece being tested to destruction, and the safe working load of running ropes, unless otherwise acceptable to the department of labor and industries on the basis of design, shall not exceed one-fifth of the breaking load of the sample tested. In the case of running ropes used in gear with a safe working load exceeding 10 tons, the safe working load shall not exceed one-fourth of the breaking load of the sample tested.

[Order 74-25, § 296-304-17015, filed 5/7/74.]

WAC 296-304-17017 Proof tests after repairs or alterations. When proof loads are applied after repairs or alterations, all parts of the assembled gear shall be examined as required in WAC 296-304-17009, 296-304-17011(3), or 296-304-17013(c), whichever is applicable.

[Order 74-25, § 296-304-17017, filed 5/7/74.]

WAC 296-304-17019 Order of tests. When both unit and loose gear proof load tests are required, the loose gear test may be carried out after completion of the unit test.

[Order 74-25, § 296-304-17019, filed 5/7/74.]

WAC 296-304-17021 Heat treatment. (1) The annealing of wrought iron gear required by this section shall be accomplished at a temperature between 1100° and 1200°F. and the exposure shall be of between thirty and sixty minutes duration. After being annealed, the gear shall be allowed to cool slowly and shall then be carefully inspected. All annealing shall be carried out in a closed furnace.

(2) When heat treatment of loose gear made of other than wrought iron or steel is recommended by the manufacturer, it shall be carried out in accordance with the specifications of the manufacturer.

[Order 74-25, § 296-304-17021, filed 5/7/74.]

WAC 296-304-17023 Competent persons. All gear certification functions shall be performed by competent persons as set forth in the following table:

Functions	Competent person
Any testing, examination, inspection, or heat treatment required in United States ports.	Responsible individual, surveyor or other authorized agent of a person accredited by the department of labor and industries under the regulations contained in this part.
Any testing, examination, inspection, or heat treatment required to be performed while the vessel is in other than United States ports.	Responsible individual, surveyor or other authorized agent of persons recognized by the Commandant of the United States Coast Guard or by a foreign nation whose certification is accepted by the department of labor and industries as being in substantial accordance with WAC 296-304-15005(1).
Testing, examination and inspection of loose gear or wire rope; heat treatment of loose gear.	Employees or authorized agents of persons accredited specifically by the department of labor and industries for this purpose under the regulations contained in this section, or the manufacturer of the gear concerned unless disapproved by the director.

[Order 74-25, § 296-304-17023, filed 5/7/74.]

WAC 296-304-180 Accreditation to certificate shore-based equipment—Scope and application. All sections of this chapter which include WAC 296-304-180 in the section number apply to accreditation to certificate shore-based equipment.

[Order 74-25, § 296-304-180, filed 5/7/74.]

WAC 296-304-18001 Eligibility for accreditation to certificate shore-based material handling devices covered by chapter 296-56 WAC of the safety and health regulations for longshoring. (1) A person applying for accreditation to carry out certification activities and to issue and maintain the requisite records must be:

(a) A manufacturer of cranes or derricks or of specialized equipment of the type for which accreditation application is made, or a person or organization representing such a manufacturer in a technical capacity; or

(b) Technically experienced and qualified to carry out examinations and/or testing, as applicable, of vessels or shore-based equipment or gear of the type for which accreditation application is made.

(2) The owner of shore-based equipment affected may designate a member of his organization to carry out certification functions respecting the owner's equipment, on the following conditions:

(a) The designee is technically experienced and qualified in the inspection and maintenance or design of the type of equipment involved, aside from employment as an operator only.

(b) The designee has applied to an accredited, nationally operating certification agency and has been granted appointment or equivalent recognition by that agency as a surveyor for the purpose intended.

(c) Certification activities carried out by the designee are cleared through the offices, and are subject to the approval, of the accredited certifying agency. When equipment is found satisfactory for use upon any survey, said equipment may be used pending receipt of notification of such approval or any disapproval.

(d) In cases where equipment is certificated by a person designated by the equipment owner, the cognizant accredited certification agency retains the right to inspect such equipment as desired and convenient, in order to ascertain the adequacy of the certification activity performed.

(3) Accreditation to conduct such nondestructive examination as may be a part of any certification activity may be granted to applicants found competent and equipped to carry out this activity.

(4) Unless exemptions are granted at the discretion of the director in cases of practical difficulties or unnecessary hardship, applicants for accreditation as specified in this section shall be prepared to carry out all necessary functions, except that any requisite wire rope tests, nondestructive examinations, and heat treatments may be carried out by the manufacturer of the gear concerned or by another person accredited specifically for these purposes.

(5) A person applying for accreditation shall have a satisfactory record of relevant experience and performance.

[Order 74-25, § 296-304-18001, filed 5/7/74.]

WAC 296-304-18003 Provisions respecting application for accreditation, action upon the application, and related matters. The provisions of WAC 296-304-14001, 296-304-14003, 296-304-14005, 296-304-14009, 296-304-14011 and 296-304-14013 shall govern accreditation to certificate shore-based material handling devices, to the extent applicable.

[Order 74-25, § 296-304-18003, filed 5/7/74.]

WAC 296-304-190 Duties of persons accredited to certificate shore-based material handling devices—General duties, exemptions. The requirements of WAC 296-304-200 through 296-304-20025 shall be strictly observed: *Provided, however,* That in cases of practical

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difficulties or unnecessary hardship, the director in his discretion may grant exemptions or variations from any provision in that section.

(1) Except as otherwise noted in this section, all functions required by WAC 296-304-200 through 296-304-20025 shall be carried out by or under the supervision of a person accredited for the purpose or by his authorized representative.

(2) All required unit proof load tests shall be carried out by the use of weights as a dead load. Only where this is not possible may dynamometers or other recording test equipment be used. Any such recording test equipment owned by an accredited person shall have been tested for accuracy within the 6 months next preceding application for accreditation or renewal thereof. Such test shall be performed with calibrating equipment which has been checked in turn so that indications are traceable to the U.S. Bureau of Standards. A copy of test reports shall accompany the accreditation application. Where test equipment is not the property of the accredited person, that person shall not issue any certificate based upon the use of such equipment unless its owner has made available a certificate of accuracy based on the requirements of this section, obtained within the year prior to such use, and stating the errors of the equipment. In any event reasonable standards of accuracy shall be met and proof loads adjusted as necessary.

(3) The qualifications of any person appointed or recognized by any accredited person for the purpose of carrying out certification functions shall meet with the approval of the director.

(4) WAC 296-304-15001 (5) and (7) and 296-304-15003 shall govern, to the extent applicable, persons accredited under WAC 296-304-180 through 296-304-18003.

[Order 74-25, § 296-304-190, filed 5/7/74.]

WAC 296-304-200 Certification of shore-based material handling devices—Scope and application. All sections of this chapter which include WAC 296-304-200 in the section number apply to certification of shore-based material handling devices.

[Order 74-25, § 296-304-200, filed 5/7/74.]

WAC 296-304-20001 General provisions. (1) Certification of shore-based material handling devices shall conform to the requirements contained in this section, except in cases for which exemptions or variations have been granted by the director as provided in WAC 296-304-18001(4) and 296-304-19001(1).

(2) Any replacements or repairs deemed necessary by the accredited person shall be carried out before application of a proof test.

(3) "Ton" in this section means a ton of 2,000 pounds.

(4) When applied to shore-based material handling devices, ratings may be stated in pounds rather than tons. When stated in tons of 2,000 pounds, this fact shall be indicated.

[Order 74-25, § 296-304-20001, filed 5/7/74.]

WAC 296-304-20003 Unit proof test and examination of cranes. (1) Unit proof tests of cranes shall be carried out at the following times:

(a) In the cases of new cranes, before initial use and every 4 years thereafter.

(b) In the cases of uncertificated cranes which have been in use, at the time of initial certification and every 4 years thereafter.

(c) After important alterations and renewals, and after repairs due to failure of, or damage to, major components.

(2) Unit proof load tests of cranes shall be carried out where applicable with the boom in the least stable direction relative to the mounting, based on the manufacturer's specifications.

(3) Unit proof load tests shall be based on the manufacturer's load ratings for the conditions of use and shall, except in the case of bridge type cranes utilizing a trolley, consist of application of a proof load of 10 percent in excess of the load ratings at maximum and minimum radius, and at such intermediate radii as the certificating authority may deem necessary in the circumstances.¹ Trolley equipped cranes shall be subject to a proof load of 25 percent in excess of the manufacturer's load rating. In cases of foreign manufacture, the manufacturer's specifications shall be subject to approval by the certificating authority as being equivalent to U.S. practice.

¹The manufacturer's load ratings are usually based upon percentage of tipping loads under some conditions and upon limitations of structural competence at others, as well as on other criteria such as type of crane mounting, whether or not outriggers are used, etc. Some cranes utilizing a trolley may have only one load rating assigned and applicable at any outreach. It is important that the manufacturer's ratings be used.

The weight of all auxiliary handling devices such as, but not limited to, magnets, hooks, slings, and clamshell buckets shall be considered part of the load.

(4) An examination shall be carried out in conjunction with each unit proof load test. The accredited person, or his authorized representative, shall make a determination as to correction of deficiencies found. The examination shall cover the following points as applicable:

(a) All functional operating mechanisms shall be examined for improper function, maladjustment, and excessive component wear, with particular attention to sheaves, pins, and drums. The examination shall include operation with partial load, in which all functions and movements, including, where applicable, maximum possible rotation in both directions, are performed.

(b) All safety devices shall be examined for malfunction.

(c) Lines, tanks, valves, drains, pumps, and other parts of air or hydraulic systems shall be examined for deterioration or leakage.

(d) Loose gear components, such as hooks, including wire rope and wire rope terminals and connections, shall be checked with particular attention to sections of wire rope exposed to abnormal wear and to sections not normally exposed for examination. The provisions of WAC 296-304-16023 shall apply in wire rope examinations. Cracked or deformed hooks shall be discarded and not reused on any equipment subject to the provisions of chapter 296-56 WAC longshoring and WAC 296-304-130 through 296-304-13503.

(e) Rope reeving shall comply with manufacturer's recommendations.

(f) Deformed, cracked, or excessively corroded members in crane structure and boom shall be repaired or replaced as necessary.

(g) Loose bolts, rivets, or other connections shall be corrected.

(h) Worn, cracked, or distorted parts affecting safe operation shall be corrected.

(i) Brake and clutch system parts, linings, pawls, and ratchets shall be examined for excessive wear and free operation.

(j) Load, boom angle, or other indicators shall be checked over their full range for any significant inaccuracy. A boom angle or radius indicator shall be fitted.

(k) It shall be ascertained that there is a durable rating chart visible to the operator, covering the complete range of the manufacturer's capacity ratings at all operating radii, for all permissible boom lengths and jib lengths, with alternate ratings for optional equipment affecting such ratings. Necessary precautions or warnings shall be included. Operating controls shall be marked or an explanation of controls shall be posted at the operator's position to indicate function.

(l) Where used, clamshell buckets or other similar equipment such as magnets, etc., shall be carefully examined in all respects, with particular attention to closing line wires and sheaves. The accredited person may supplement such examination by requesting any operational tests as may be appropriate.

(m) Careful examination of the junction areas of removable boom sections, particularly for proper seating, cracks, deformities, or other defects in securing bolts and in the vicinity of such bolts.

(n) It shall be ascertained that no counterweights in excess of the manufacturer's specifications are fitted.

(o) Such other examination or supplemental functional tests shall be made as may be deemed necessary by the accredited person under the circumstances.

[Order 74-25, § 296-304-20003, filed 5/7/74.]

WAC 296-304-20005 Annual examination of cranes.

(1) In any year in which no quadrennial unit proof test is required, an examination shall be carried out by an accredited person or his authorized representative. Such examination shall be made not later than the anniversary date of the quadrennial certification and shall conform with the requirements of WAC 296-304-20003(4).

[Order 74-25, § 296-304-20005, filed 5/7/74.]

WAC 296-304-20007 Unit proof test and examination of derricks.

(1) Unit proof tests of derricks shall be carried out at the same times as are specified in WAC 296-304-20003(1) for cranes.

(2) Unit proof load tests and safe working load ratings shall be based on the design load ratings at the ranges of boom angles or operating radii. Unit proof loads shall exceed the safe working load as follows:

Safe working load	Proof load
Up to 20 tons	25 percent in excess.
20-50 tons	5 tons in excess.
Over 50 tons	10 percent in excess.

[Order 74-25, § 296-304-20015, filed 5/7/74.]

Proof loads shall be applied at the designed maximum and minimum boom angles or radii, or, if this is impracticable, as close to these as practicable. The angles or radii of test shall be stated in the certificate of test. Proof loads shall be swung as far as possible in both directions. The weight of all auxiliary handling devices shall be considered a part of the load.

(3) After satisfactory completion of a unit proof load test the derrick and all component parts thereof shall be carefully examined in accordance with the requirements of WAC 296-304-20003(4), as far as applicable.

[Order 74-25, § 296-304-20007, filed 5/7/74.]

WAC 296-304-20009 Annual examination of derricks. (1) In any year in which no quadrennial unit proof test is required, an examination shall be carried out by an accredited person or his authorized representative. Such annual examination shall be made not later than the anniversary date of the quadrennial certification and shall conform in all applicable respects with WAC 296-304-20003(4).

[Order 74-25, § 296-304-20009, filed 5/7/74.]

WAC 296-304-20011 Determination of crane or derrick safe working loads and limitations in absence of manufacturer's data. (1) In the event neither manufacturer's data nor design data on safe working loads (including any applicable limitations) are obtainable, the safe working load ratings assigned shall be based on the owner's information and warranty that those so assigned are correct. Unit test certificates shall state the basis for any such safe working load assignment.

[Order 74-25, § 296-304-20011, filed 5/7/74.]

WAC 296-304-20013 Safe working load reduction. (1) If the operation in which equipment is engaged never utilizes more than a fraction of the safe working load rating, the owner of such equipment may, at his option, have the crane or derrick certificated for and operated at a lesser maximum safe working load in keeping with the use and based on radius and other pertinent factors: *Provided, however,* That the equipment concerned is physically capable of operation at the original load rating and the load reduction is not for the purpose of avoiding correction of any deficiency.

[Order 74-25, § 296-304-20013, filed 5/7/74.]

WAC 296-304-20015 Safe working load increase. (1) In no case shall safe working loads be increased beyond the manufacturer's ratings or original design limitations unless such increase meets with the manufacturer's approval. Where the manufacturer's services are not available, or where the equipment is of foreign manufacture, engineering design analysis by, or acceptable to, the accredited certification agency is required. All necessary structural changes shall be carried out.

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WAC 296-304-20017 Nondestructive examination. (1) Wherever it is considered necessary by the accredited person or his authorized representative and wherever it is practical and advisable to avoid disassembly of equipment, removal of pins, etc., examination of structure or parts by electronic ultrasonic or other nondestructive methods may be carried out, provided that the procedure followed is acceptable to the director and the person carrying out such examination is accredited or acceptable to the director for the purpose.

[Order 74-25, § 296-304-20017, filed 5/7/74.]

WAC 296-304-20019 Wire rope. (1) Wire rope and replacement wire rope shall be of the same size, same or better grade, and same construction as originally furnished by the equipment manufacturer or contemplated in the design, unless otherwise recommended by the equipment or the wire rope manufacturer due to actual working condition requirements. In the absence of specific requirements as noted, wire rope shall be of a size and construction suitable for the purpose, and a safety factor of 4 shall be adhered to, and verified by wire rope test certificate.

(2) Wire rope in use on equipment previously constructed and prior to initial certification of said equipment shall not be required to be tested but shall be subject to thorough examination at the time of initial certification of the equipment.

[Order 74-25, § 296-304-20019, filed 5/7/74.]

WAC 296-304-20021 Heat treatment. (1) Wherever heat treatment of any loose gear is recommended by the manufacturer, it shall be carried out in accordance with the specifications of the manufacturer.

[Order 74-25, § 296-304-20021, filed 5/7/74.]

WAC 296-304-20023 Examination of bulk cargo loading or discharging spouts or suckers. (1) Those portions of bulk cargo loading or discharging spouts or suckers which extend over vessels, together with any portable extensions, rigging components, outriggers, and attachment points, supporting them or any of their components vertically, shall be examined annually. The examination shall be carried out with particular attention to the condition of wire rope and accessories. The equipment shall not be considered satisfactory unless, in the opinion of the accredited person or his authorized representative, it is deemed fit to serve its intended function.

[Order 74-25, § 296-304-20023, filed 5/7/74.]

WAC 296-304-20025 Documentation. (1) Documents issued respecting a certification function by an accredited person shall be on forms approved for such use by the director and shall so state.

(2) Such documents shall be issued by the accredited person to the owners of affected equipment, attesting to satisfactory compliance with applicable requirements. The forms used shall contain the following information:

- (a) Unit proof tests where required—

(i) Identification of crane or derrick including manufacturer, model number, serial number, and ownership.

(ii) Basis for assignment of safe working load ratings, with the ratings assigned (i.e., whether based on manufacturer's ratings, whether for any specific service, etc.).

(iii) Proof test details noting radii and proof loads, how applied, and, where applicable, direction relative to mounting.

(iv) A statement that the test and associated examination were conducted and all applicable requirements of this section are met.

(v) Any necessary remarks or supplementary data, including limitations imposed and the reason therefor.

(vi) Name of accredited person and identification of authorized representative actually conducting test and/or examination.

(vii) Authorized signature of accredited person, date and place of test and/or examination.

(b) Annual examination of cranes or derricks—

(i) Information specified in WAC 296-304-20025 (2)(a)(i), (v), (vi) and (vii).

(ii) A statement that the required examination has been carried out and that, in the opinion of the accredited person or his authorized representative, the equipment has been found in compliance in all applicable respects with the requirements of this section.

(c) Annual examination of bulk cargo loadings or discharging spouts or suckers—

(i) Specific identification of equipment.

(ii) A statement that examination has been completed and that, in the opinion of the accredited person or his authorized representative, the equipment meets the criteria of WAC 296-304-20023(1).

(iii) Information specified in WAC 296-304-20025 (2)(a)(i), (v), (vi) and (vii).

(3) Certificates relating to wire rope, whether tested by or under the supervision of the accredited person or by its manufacturer and whether or not issued on the basis of the manufacturer's certificates, shall follow the general format of a wire rope test form approved by the director.

(4) Accredited persons shall advise owners of affected equipment of the necessity for maintaining required documentation or acceptable copies thereof available for inspection at or near the worksite of the equipment involved.

(a) Where initial and periodic tests as well as annual examinations are required, documentation available for inspection shall include the latest unit test certificate and any subsequent annual examination certificates, together with wire rope test certificates relating to any replacements since the last unit test or annual examination.

(b) Where only annual examination is required, documentation available for inspection shall include the latest annual examination certificate and wire rope test certificates relating to any wire replaced since the last annual examination.

(c) In the event that heat treatment of any loose gear is recommended by its manufacturer, the latest heat treatment certificate, attesting to compliance with the manufacturer's specifications, shall be part of the available documentation.

(5) No certification shall be issued until any deficiencies considered by the accredited person to constitute a currently

unsatisfactory condition have been corrected. Replacement parts shall be of equal or better quality as original equipment and suitable for the purpose. In the event deficiencies remain uncorrected and no certification therefore is issued, the accredited person shall inform of the circumstances the nearest district office of the department of labor and industries.

[Order 74-25, § 296-304-20025, filed 5/7/74.]

Chapter 296-305 WAC

SAFETY STANDARDS FOR FIRE FIGHTERS

WAC

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- 296-305-08000 Appendices.

- Emergency Order 77-24, filed 11/17/77, effective 12/17/77.] Repealed by 96-11-067, filed 5/10/96, effective 1/1/97. Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060.
- 296-305-030 Employee's responsibility. [Order 77-20, § 296-305-030, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.] Repealed by 96-11-067, filed 5/10/96, effective 1/1/97. Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060.
- 296-305-035 Safe place standards. [Order 77-20, § 296-305-035, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.] Repealed by 96-11-067, filed 5/10/96, effective 1/1/97. Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060.
- 296-305-040 First-aid training and certification. [Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-305-040, filed 11/30/83; Order 77-20, § 296-305-040, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.] Repealed by 96-11-067, filed 5/10/96, effective 1/1/97. Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060.
- 296-305-045 First-aid kits. [Order 77-20, § 296-305-045, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.] Repealed by 96-11-067, filed 5/10/96, effective 1/1/97. Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060.
- 296-305-060 Personal protective equipment and clothing. [Statutory Authority: Chapter 49.17 RCW. 88-14-108 (Order 88-11), § 296-305-060, filed 7/6/88. Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-305-060, filed 11/30/83; Order 77-20, § 296-305-060, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.] Repealed by 96-11-067, filed 5/10/96, effective 1/1/97. Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060.
- 296-305-06009 Body protection. [Statutory Authority: Chapter 49.17 RCW. 91-11-070 (Order 91-01), § 296-305-06009, filed 5/20/91, effective 6/20/91. Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-305-06009, filed 11/30/83; Order 77-20, § 296-305-06009, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.] Repealed by 96-11-067, filed 5/10/96, effective 1/1/97. Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060.
- 296-305-06011 Head protection. [Statutory Authority: Chapter 49.17 RCW. 88-14-108 (Order 88-11), § 296-305-06011, filed 7/6/88. Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-305-06011, filed 11/30/83; Order 77-20, § 296-305-06011, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.] Repealed by 96-11-067, filed 5/10/96, effective 1/1/97. Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060.
- 296-305-063 Respiratory equipment. [Statutory Authority: Chapter 49.17 RCW. 91-24-017 (Order 91-07), § 296-305-063, filed 11/22/91, effective 12/24/91; 88-14-108 (Order 88-11), § 296-305-063, filed 7/6/88. Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-305-063, filed 11/30/83; Order 77-20, § 296-305-063, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.] Repealed by 96-11-067, filed 5/10/96, effective 1/1/97. Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060.
- 296-305-06301 Respiratory equipment effective dates. [Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-305-06301, filed 11/30/83; Order 77-20, § 296-305-06301, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.] Repealed by 88-14-108 (Order 88-11), filed 7/6/88. Statutory Authority: Chapter 49.17 RCW.
- 296-305-06303 Respiratory equipment approvals. [Order 77-20, § 296-305-06303, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.] Repealed by 88-14-108 (Order 88-11), filed 7/6/88. Statutory Authority: Chapter 49.17 RCW.

DISPOSITION OF SECTIONS FORMERLY CODIFIED IN THIS CHAPTER

- 296-305-001 Foreword. [Order 77-20, § 296-305-001, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.] Repealed by 96-11-067, filed 5/10/96, effective 1/1/97. Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060.
- 296-305-003 Effective date. [Order 77-20, § 296-305-003, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.] Repealed by 96-11-067, filed 5/10/96, effective 1/1/97. Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060.
- 296-305-005 Scope and application. [Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-305-005, filed 11/30/83. Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 42.30 and 43.22 RCW. 78-09-092 (Order 78-16), § 296-305-005, filed 8/31/78; Order 77-20, § 296-305-005, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.] Repealed by 96-11-067, filed 5/10/96, effective 1/1/97. Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060.
- 296-305-007 Definitions. [Statutory Authority: Chapter 49.17 RCW. 88-14-108 (Order 88-11), § 296-305-007, filed 7/6/88. Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-305-007, filed 11/30/83; Order 77-20, § 296-305-007, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.] Repealed by 96-11-067, filed 5/10/96, effective 1/1/97. Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060.
- 296-305-010 Variance and procedure. [Order 77-20, § 296-305-010, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.] Repealed by 96-11-067, filed 5/10/96, effective 1/1/97. Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060.
- 296-305-015 Injury and illness report for fire fighters. [Statutory Authority: Chapter 49.17 RCW. 90-17-051 (Order 90-10), § 296-305-015, filed 8/13/90, effective 9/24/90. Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-305-015, filed 11/30/83; Order 77-20, § 296-305-015, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.] Repealed by 96-11-067, filed 5/10/96, effective 1/1/97. Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060.
- 296-305-017 Accident investigation. [Order 77-20, § 296-305-017, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.] Repealed by 96-11-067, filed 5/10/96, effective 1/1/97. Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060.
- 296-305-020 Accident prevention programs. [Order 77-20, § 296-305-020, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.] Repealed by 96-11-067, filed 5/10/96, effective 1/1/97. Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060.
- 296-305-025 Management's responsibility. [Statutory Authority: Chapter 49.17 RCW. 94-16-145, § 296-305-025, filed 8/3/94, effective 9/12/94; 91-24-017 (Order 91-07), § 296-305-025, filed 11/22/91, effective 12/24/91; 89-11-035 (Order 89-03), § 296-305-025, filed 5/15/89, effective 6/30/89; Order 77-20, § 296-305-025, filed 10/18/77 and

- 296-305-06305 Respiratory equipment inspection. [Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-305-06305, filed 11/30/83; Order 77-20, § 296-305-06305, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.] Repealed by 88-14-108 (Order 88-11), filed 7/6/88. Statutory Authority: Chapter 49.17 RCW.
- 296-305-06307 Respiratory equipment testing. [Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-305-06307, filed 11/30/83; Order 77-20, § 296-305-06307, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.] Repealed by 88-14-108 (Order 88-11), filed 7/6/88. Statutory Authority: Chapter 49.17 RCW.
- 296-305-06309 Respiratory protection equipment maintenance and repair. [Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-305-06309, filed 11/30/83; Order 77-20, § 296-305-06309, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.] Repealed by 88-14-108 (Order 88-11), filed 7/6/88. Statutory Authority: Chapter 49.17 RCW.
- 296-305-06311 Respiratory equipment training. [Order 77-20, § 296-305-06311, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.] Repealed by 88-14-108 (Order 88-11), filed 7/6/88. Statutory Authority: Chapter 49.17 RCW.
- 296-305-06313 Filling air cylinders. [Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-305-06313, filed 11/30/83.] Repealed by 88-14-108 (Order 88-11), filed 7/6/88. Statutory Authority: Chapter 49.17 RCW.
- 296-305-064 Fire overhaul. [Statutory Authority: Chapter 49.17 RCW. 88-14-108 (Order 88-11), § 296-305-064, filed 7/6/88.] Repealed by 96-11-067, filed 5/10/96, effective 1/1/97. Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060.
- 296-305-065 Requirements for fire stations. [Order 77-20, § 296-305-065, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.] Repealed by 96-11-067, filed 5/10/96, effective 1/1/97. Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060.
- 296-305-070 Automotive fire apparatus. [Order 77-20, § 296-305-070, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.] Repealed by 96-11-067, filed 5/10/96, effective 1/1/97. Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060.
- 296-305-075 Fire service equipment. [Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-305-075, filed 11/30/83; Order 77-20, § 296-305-075, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.] Repealed by 96-11-067, filed 5/10/96, effective 1/1/97. Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060.
- 296-305-080 Testing fire service equipment. [Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-305-080, filed 11/30/83; Order 77-20, § 296-305-080, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.] Repealed by 96-11-067, filed 5/10/96, effective 1/1/97. Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060.
- 296-305-085 Fire combat training. [Order 77-20, § 296-305-085, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.] Repealed by 96-11-067, filed 5/10/96, effective 1/1/97. Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060.
- 296-305-090 Operations. [Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-305-090, filed 11/30/83; Order 77-20, § 296-305-090, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.] Repealed by 96-11-067, filed 5/10/96, effective 1/1/97. Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060.
- 296-305-095 Fire overhaul. [Order 77-20, § 296-305-095, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.] Repealed by 96-11-067, filed 5/10/96, effective 1/1/97. Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060.
- 296-305-9901 Testing extension ladders—Figure 14. [Order 77-20, Illustration (codified as WAC 296-305-9901), filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.] Repealed by 88-14-108 (Order 88-11), filed 7/6/88. Statutory Authority: Chapter 49.17 RCW.
- 296-305-9902 Testing extension ladders—Figure 15. [Order 77-20, Illustration (codified as WAC 296-305-9902), filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.] Repealed by 88-14-108 (Order 88-11), filed 7/6/88. Statutory Authority: Chapter 49.17 RCW.
- 296-305-9903 Testing extension ladders—Illustration. [Order 77-20, Illustration (codified as WAC 296-305-9903), filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.] Repealed by 88-14-108 (Order 88-11), filed 7/6/88. Statutory Authority: Chapter 49.17 RCW.
- 296-305-9904 Testing extension ladders—Illustration. [Order 77-20, Illustration (codified as WAC 296-305-9904), filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.] Repealed by 88-14-108 (Order 88-11), filed 7/6/88. Statutory Authority: Chapter 49.17 RCW.
- 296-305-9905 Testing extension ladders—Illustration. [Order 77-20, Illustration (codified as WAC 296-305-9905), filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.] Repealed by 88-14-108 (Order 88-11), filed 7/6/88. Statutory Authority: Chapter 49.17 RCW.
- 296-305-9906 Testing extension ladders—Illustration. [Order 77-20, Illustration (codified as WAC 296-305-9906), filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.] Repealed by 88-14-108 (Order 88-11), filed 7/6/88. Statutory Authority: Chapter 49.17 RCW.
- 296-305-100 Ladders. [Statutory Authority: Chapter 49.17 RCW. 88-14-108 (Order 88-11), § 296-305-100, filed 7/6/88. Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-305-100, filed 11/30/83; Order 77-20, § 296-305-100, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.] Repealed by 96-11-067, filed 5/10/96, effective 1/1/97. Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060.
- 296-305-105 Aerial ladders. [Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-305-105, filed 11/30/83; Order 77-20, § 296-305-105, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.] Repealed by 96-11-067, filed 5/10/96, effective 1/1/97. Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060.
- 296-305-110 Elevated platforms. [Statutory Authority: Chapter 49.17 RCW. 91-03-044 (Order 90-18), § 296-305-110, filed 1/10/91, effective 2/12/91. Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-305-110, filed 11/30/83; Order 77-20, § 296-305-110, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.] Repealed by 96-11-067, filed 5/10/96, effective 1/1/97. Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060.
- 296-305-115 Electrical. [Order 77-20, § 296-305-115, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.] Repealed by 96-11-067, filed 5/10/96, effective 1/1/97. Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060.

WAC 296-305-01001 Foreword. These fire fighter safety and health standards were adopted by the department of labor and industries in accordance with the provisions of the Washington Industrial Safety and Health Act (WISHA)

of 1973 (chapter 49.17 RCW), with recommendations from the fire service advisory committee.

The purpose of this chapter is to assist employers and employees in the reduction of work related injuries and illnesses. In addition to providing an enforceable set of safety and health standards for the fire protection services, it is the intent of the department that the provisions of this chapter be used to assist both employers and employees in achieving the safest workplace reasonably attainable under the conditions to which employees are or will be exposed.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-01001, filed 5/10/96, effective 1/1/97.]

WAC 296-305-01002 Effective date. Unless a particular provision of this chapter specifies otherwise, the effective date of chapter 296-305 WAC, shall be January 1, 1997.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-01002, filed 5/10/96, effective 1/1/97.]

WAC 296-305-01003 Scope and application. (1) The rules of this chapter shall apply with respect to any and all activities, operations and equipment of employers and employees involved in providing fire protection services which are subject to the provisions of the Washington Industrial Safety and Health Act of 1973 (chapter 49.17 RCW).

(2) The provisions of this chapter apply to all fire fighters and their work places, including the fire combat scene. Although enforcement of applicable standards will result from provable violations of these standards at the fire combat scene, agents of the department will not act in any manner that will reduce or interfere with the effectiveness of the emergency response of a fire fighting unit. Activities directly related to the combating of a fire will not be subjected to the immediate restraint provisions of RCW 49.17.130.

(3) In the development of this document many consensus standards of the industry were considered and evaluated as to adaptability to the Washington state fire service industry. Where adaptable and meaningful, the fire fighter safety elements of these standards were incorporated into this WAC. Chapter 296-305 WAC, shall be considered as the fire fighter safety standards for the state of Washington.

(4) The provisions of this chapter cover existing requirements that apply to all fire departments. All fire departments shall have in place their own policy statement and operating instructions that meet or exceed these requirements. This chapter contains state and/or federal performance criteria that fire departments shall meet.

(5) Unless specifically stated otherwise by rule, if a duplication of regulations, or a conflict exists between the rules regulating wildland fire fighting and other rules in the chapter, only the rules regulating wildland fire fighting shall apply to wildland fire fighting activities and equipment.

(6) The provisions of this chapter shall be supplemented by the provisions of the general safety and health standards of the department of labor and industries, chapters 296-24 (including Part G-2, Fire protection) and 296-62 WAC. In the event of conflict between any provision(s) of this chapter

and any provision(s) of the general safety and health standards, the provision(s) of this chapter shall apply.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-01003, filed 5/10/96, effective 1/1/97.]

WAC 296-305-01005 Definitions. Unless the context indicates otherwise, words used in this chapter shall have the meaning given in this section.

Accident: An unexpected event that interrupts or interferes with the orderly progress of the fire department operations and may or may not include personal injury or property damage.

Accountability system: A system of fire fighter accountability that provides for the tracking and inventory of all members.

ACGIH: American Conference of Governmental Industrial Hygienists.

Aerial ladder: A ladder mounted on top of an apparatus, hydraulic or pneumatic controlled.

Aerial tower: Telescopic elevating platform or water tower assembly usually with a ladder on top of the section.

Aerial platform: A device consisting of two or more booms or sections with a passenger carrying platform assembly.

ANSI: American National Standards Institute.

Apparatus: A mobile piece of fire equipment such as a pumper, aerial, tender, automobile, etc.

Approved:

(1) A method, equipment, procedure, practice, tool, etc., which is sanctioned, consented to, confirmed or accepted as good or satisfactory for a particular purpose or use by a person, or organization authorized to make such a judgment.

(2) Means approved by the director of the department of labor and industries or his/her authorized representative: *Provided, however,* That should a provision of this chapter state that approval by an agency or organization other than the department of labor and industries is required, such as Underwriters' Laboratories or the Bureau of Mines, the provisions of chapter 296-24 WAC, Part A-1, shall apply.

Audiogram: A chart, graph, or table resulting from an audiometric test showing an individual's hearing threshold levels as a function of frequency.

Authorized person: A person approved or assigned by the employer to perform a specific type of duty or duties or to be at a specific location or locations at the job site.

Beacon: A flashing or rotating light.

Bloodborne pathogens: Pathogenic microorganisms that are present in human blood and can cause disease in humans. These pathogens include, but are not limited to, hepatitis B virus (HBV) and human immunodeficiency virus (HIV).

Blowup (wildfire): Sudden increase in fire intensity or rate of spread sufficient to preclude direct control or to upset existing control plans. Often accompanied by violent convection and may have other characteristics of a fire storm.

Chemical-protective clothing: Items made from chemical-resistive materials, such as clothing, hood, boots, and gloves, that are designed and configured to protect the wearer's torso, head, arms, legs, hands, and feet from hazardous materials. Chemical-protective clothing (gar-

ments) can be constructed as a single, or multi-piece, garment. The garment may completely enclose the wearer either by itself or in combination with the wearer's respiratory protection, attached or detachable hood, gloves, and boots.

Chief: The employer representative highest in rank who is responsible for the fire department's operation.

Combat scene: The site where the suppression of a fire or emergency exists.

Confinement: Those procedures taken to keep a material in a defined or local area.

Confined space: Means a space that:

(1) Is large enough and so configured that an employee can bodily enter and perform assigned work; and

(2) Has limited or restricted means for entry or exit (for example, tanks, vessels, silos, storage bins, hoppers, vaults, and pits are spaces that may have limited means of entry.); and

(3) Is not designed for continuous employee occupancy.

Containment: The actions taken to keep a material in its container (e.g. stop the release of the material or reduce the amount being released.)

Contaminated: The presence or the reasonably anticipated presence of nuisance materials foreign to the normal atmospheres, blood, hazardous waste, or other potentially infectious materials on an item or surface.

Contaminated laundry: Laundry which has been soiled with blood or other potentially infectious materials or may contain contaminated sharps.

Contamination: The process of transferring a hazardous material from its source to people, animals, the environment, or equipment, which may act as a carrier.

dBA: A measure of noise level expressed as decibels measured on the "A" scale.

Deck pipe: A permanently mounted device which delivers a large stream of water.

Decontamination:

(1) The physical or chemical process of reducing and preventing the spread of contamination from persons or equipment used at a hazardous materials incident.

(2) The use of physical or chemical means to remove, inactivate, or destroy bloodborne pathogens on a surface or item to the point where they are no longer capable of transmitting infectious particles and the surface or item is rendered safe for handling, use, or disposal.

Department: Department of labor and industries.

Director of fire department: The chief or principle administrator of the fire department.

Director: The director of the department of labor and industries, or his/her designated representative.

Disinfection: A procedure which inactivates virtually all recognized pathogenic microorganisms, but not necessarily all microbial forms (example: bacterial endospores) on inanimate objects.

Drill tower: A structure which may or may not be attached to the station and which is principally used for training fire fighters in fire service techniques.

Driver: A person having satisfactorily completed the fire department's "requirements of driver" of a specific piece of fire apparatus.

Emergency: A sudden and unexpected event calling for immediate action.

Emergency incident: A specific emergency operation.

Emergency medical care: The provision of treatment to, and/or transportation of, patients which may include first-aid, cardiopulmonary resuscitation, basic life support, advanced life support, and other medical procedures that occur prior to arrival at a hospital or other health care facility.

Emergency operations: Activities of the fire department relating to rescue, fire suppression, emergency medical care, and special operations, including response to the scene of an incident and all functions performed at the scene.

Employee: An employee of an employer who is employed in the business of his/her employer whether by way of manual labor or otherwise and every person in this state who is engaged in the employment of or who is working under an independent contract the essence of which is their personal labor for an employer under this chapter whether by way of manual labor or otherwise. Also see "Member."

Employer: Any person, firm, corporation, partnership, business trust, legal representative, or other business entity which engages in any business, industry, profession, or activity in this state and employs one or more employees or who contracts with one or more persons, the essence of which is the personal labor of such person or persons and includes the state, counties, cities, and all municipal corporations, public corporations, political subdivisions of the state, and charitable organizations.

Employer representative: A fire department officer authorized by the chief or director of the fire department to act in his/her behalf.

Engine (pumper): A piece of apparatus equipped with hose and a pump for the purpose of supplying water under pressure through hose lines.

Engineering control: Any procedure other than an administrative control that reduces exposures by modifying the source or reducing the exposure to an individual. Examples of engineering controls include the use of isolation, containment, encapsulation, sound absorbing materials for noise control, and ventilation.

Explosion proof equipment: Equipment enclosed in a case that is capable of withstanding an explosion or a specified gas or vapor which may occur within it and of preventing the ignition of a specified gas or vapor surrounding the enclosure by sparks, flashes, or explosion of the gas or vapor within, and which operates at such an external temperature that it will not ignite a surrounding flammable atmosphere.

Fastest means available: The (nearest-closest) telephone, portable radio, mobile radio, telephone/radio dispatcher or any other mode of mechanical communication.

Fire apparatus: A fire department emergency vehicle used for rescue, fire suppression, or other specialized functions.

Fire boat: A fire department watercraft having a permanent, affixed fire fighting capability.

Fire combat training: Training received by fire fighters on the drill ground, drill tower, or industrial site to maintain the fire fighter's proficiency.

Fire department: An organization providing any or all of the following: Rescue, fire suppression, and other related activities. For the purposes of this standard the term "Fire

Department" shall include any public, private, or military organization engaging in this type of activity.

Fire department facility: Any building or area owned, operated, occupied, or used by a fire department on a routine basis. This does not include locations where a fire department may be summoned to perform emergency operations or other duties, unless such premises are normally under the control of the fire department.

Fire department safety officer: The member of the fire department assigned and authorized as the principal safety officer to perform the duties and responsibilities specified in this standard.

Fire fighter: A member of a fire department whose duties require the performance of essential fire fighting functions or substantially similar functions.

Fire retardant: Any material used to reduce, stop or prevent the flame spread.

Fly: Extendible sections of ground or aerial ladders.

Foot stand, ladder: Devices attached to inside of beams of ladders that when folded down, provide foot space.

Ground jack: Heavy jacks attached to frame of chassis of aerial-equipped apparatus to provide stability when the aerial portion of the apparatus is used.

Ground mobile attack: The activities of wildland fire fighting with hose lines being used by personnel working around a moving engine. See mobile attack.

Guideline: An organizational directive that establishes a standard course of action.

Halyard: Rope used on extension ladders for the purpose of raising or lowering fly section(s). A wire cable may be referred to as a halyard when used on the uppermost fly section(s) of three or four section extension ladders.

Hazard communication program: A procedure to address comprehensively the issue of evaluating the potential hazards of chemicals and communicating information concerning hazards and appropriate protective measures to employees. See chapter 296-62 WAC, Part C, Hazard Communications.

Hazardous area: The immediate area where members might be exposed to a hazard.

Hazardous atmosphere: Any atmosphere, either immediately or not immediately dangerous to life or health, which is oxygen deficient or which contains a toxic or disease-producing contaminant.

Hazardous condition: The physical condition or act which is causally related to accident occurrence. The hazardous condition is related directly to both the accident type and the agency of the accident.

Hazardous material: A substance (solid, liquid, or gas) that when released is capable of creating harm to people, the environment, and property.

Hazardous substances: Substances that present an unusual risk to persons due to properties of toxicity, chemical activity, corrosivity, etiological hazards of similar properties.

HEPA filtration: High efficiency particulate air filtration found in vacuum system capable of filtering 0.3 micron particles with 99.97% efficiency.

Hose bed: Portion of fire apparatus where hose is stored.

Hose tower: A vertical enclosure where hose is hung to dry.

Hot zone: Area immediately surrounding a hazardous materials incident, which extends far enough to prevent adverse effects from hazardous materials releases to personnel outside the zone. This zone is also referred to as the exclusion zone or the restricted zone in other documents.

Identify: To select or indicate verbally or in writing using recognized standard terms. To establish the identity of; the fact of being the same as the one described.

IDLH: Immediately dangerous to life and health.

Imminent hazard (danger): An act or condition that is judged to present a danger to persons or property and is so immediate and severe that it requires immediate corrective or preventative action.

Incident commander: The person in overall command of an emergency incident. This person is responsible for the direction and coordination of the response effort.

Incident command system (ICS): A system that includes: Roles, responsibilities, operating requirements, guidelines and procedures for organizing and operating an on-scene management structure.

Incipient (phase) fire: The beginning of a fire; where the oxygen content in the air has not been significantly reduced and the fire is producing minute amounts of water vapor, carbon dioxide, carbon monoxide and other gases; the room has a normal temperature and can be controlled or extinguished with a portable fire extinguisher or small hose, e.g., a kitchen fire.

Industrial fire brigade: An organized group of employees whose primary employment is other than fire fighting; who are knowledgeable, trained and skilled in the safe evacuation of employees during emergency situations, and in assisting in fire fighting operations.

Initial stage (initial action): Shall encompass the control efforts taken by resources which are first to arrive at an incident requiring immediate action to prevent or mitigate the loss of life or serious injury to citizenry and fire fighters.

Injury: Physical damage suffered by a person that requires treatment by a practitioner of medicine (a physician, nurse, paramedic or EMT) within one year of the incident regardless of whether treatment was actually received.

Life safety or rescue rope: Rope dedicated solely for the purpose of constructing lines for supporting people during rescue, fire fighting, or other emergency operations, or during training evolutions.

Line: Rope when in use.

Live fire training: Any fire set within a structure, tank, pipe, pan, etc., under controlled conditions to facilitate the training of fire fighters under actual fire conditions.

Locking in: The act of securing oneself to a ladder by hooking a leg over a rung and placing top of foot against the other leg or against the ladder.

Manned station: See staffed station.

May: A permissive use or an alternative method to a specified requirement.

Member: A person involved in performing the duties and responsibilities of a fire department under the auspices of the organization. A fire department member may be a full-time or part-time employee or a paid or unpaid volunteer, may occupy any position or rank within the fire department, and engages in emergency operations. Also see Employee.

Mobile attack: The act of fighting wildland fires from a moving engine.

Monitor: A portable appliance that delivers a large stream of water.

Mop up: The act of making a wildfire/wildland fire safe after it is controlled, such as extinguishing or removing burning materials along or near the control line, felling snags, trenching logs to prevent rolling.

NFPA: National Fire Protection Association.

NIIMS: National Interagency Incident Management System.

NIOSH: National Institute of Occupational Safety and Health.

Nondestructive testing: A test to determine the characteristics or properties of a material or substance that does not involve its destruction or deterioration.

Nonskid: The surface treatment that lessens the tendency of a foreign substance to reduce the coefficient of friction between opposing surfaces.

Occupational exposure: Means reasonably anticipated skin, eye, mucous membrane or parenteral contact with blood or other potentially infectious materials that may result from the performance of an employee's duties.

Officer: (1) Person in charge of a particular task or assignment.

(2) A supervisor.

OSHA: Occupational Safety and Health Administration.

Other potentially infectious materials (OPIM): (1) The following body fluids: Semen, vaginal secretions, cerebrospinal fluid, synovial fluid, pleural fluid, pericardial fluid, peritoneal fluid, amniotic fluid, saliva in dental procedures, any body fluid that is visibly contaminated with blood, and all body fluids in situations where it is difficult or impossible to differentiate between body fluids;

(2) Any unfixed tissue or organ (other than intact skin) from a human (living or dead); and

(3) HIV-containing cell or tissue cultures, organ cultures, and HIV-or HBV-containing culture medium or other solutions; and blood, organs, or other tissues from experimental animals infected with HIV or HBV.

Outrigger: Manually or hydraulically operated metal enclosures and jacks which are extended and placed in contact with the ground to give the apparatus a wide, solid base to support different loads.

Overhauling: That portion of fire extinguishment involving discovery of hidden fires or smoldering material.

PASS: Personal alert safety system.

PEL: Permissible exposure limit.

Personal protective equipment (PPE): (1) The equipment provided to shield or isolate a person from the chemical, physical, and thermal hazards that may be encountered at a hazardous materials incident. Personal protective equipment includes both personal protective clothing and respiratory protection. Adequate personal protective equipment should protect the respiratory system, skin, eyes, face, hands, feet, head, body, and hearing.

(2) Specialized clothing or equipment worn by an employee for protection against a hazard. General work clothes (e.g., uniforms, pants, shirts, or blouses) not intended to function as protection against a hazard are not considered to be personal protective equipment.

Place of employment: Any premises, room or other place where an employee or employees are employed for the performance of labor or service over which the employer has the right of access or control. For the purposes of this code, fireground and emergency scenes are also considered places of employment.

Platform: The portion of a telescoping or articulating boom used as a working surface.

Positive communication: Visual, audible, physical, safety guide rope, or electronic means which allows for two way message generation and reception.

PPE: Personal protective equipment.

Prefire training: The training of fire fighters in recognizing sources and locations of potential fires and the method of fire combat to be used.

Probable fatality: (1) An occupational injury or illness, which, by the doctor's prognosis, could lead to death.

(2) An occupational injury or illness, which by its very nature, is considered life threatening.

Protective clothing: Equipment designed to protect the wearer from heat and/or hazardous materials contacting the skin or eyes. Protective clothing is divided into five types:

(1) Structural fire fighting protective clothing;

(2) Liquid splash-protective clothing;

(3) Vapor-protective clothing;

(4) High temperature-protective proximity clothing; and

(5) Wildland fire fighting clothing.

Note: See Protective ensemble.

Protective ensemble: Multiple elements of clothing and equipment designed to provide a degree of protection for fire fighters from adverse exposures to the inherent risks of structural fire fighting operations and certain other emergency operations. The elements of the protective ensemble are helmets, coats, trousers, gloves, footwear, interface components (hoods), and if applicable, personal alert system (PASS) devices, and self-contained breathing apparatus.

Pumper: See engine.

Qualified: One who by possession of a recognized degree, certificate or professional standing, or who by knowledge, training or experience has successfully demonstrated his/her ability to solve or resolve problems related to the subject matter, the work or the project.

RCW: Revised Code of Washington.

Rescue: Those activities directed at locating endangered persons at an emergency incident and removing those persons from danger.

Rescue craft: Any fire department watercraft used for rescue operations.

Respiratory equipment: Self-contained breathing apparatus designed to provide the wearer with a supply of respirable atmosphere carried in or generated by the breathing apparatus. When in use, this breathing apparatus requires no intake of air or oxygen from the outside atmosphere.

(1) Respirators (closed circuit): Those types of respirators which retain exhaled air in the system and recondition such air for breathing again.

(2) Respirators (open circuit): Those types of respirators which exhaust exhaled air to the outside of the mask into the ambient air.

(3) **Respirators (demand):** Those types of respirators whose input air to the mask is started when a negative pressure is generated by inhalation.

(4) **Respirators (pressure demand):** Those types of respirators which constantly and automatically maintain a positive pressure in the mask by the introduction of air when the positive pressure is lowered (usually from .018 psi to .064 psi) through the process of inhalation or leakage from the mask.

Respiratory protection: Equipment designed to protect the wearer from the inhalation of contaminants. Respiratory protection is divided into three types:

(1) Positive pressure self-contained breathing apparatus (SCBA);

(2) Positive pressure airline respirators;

(3) Negative pressure air purifying respirators.

Responding: The usual reference to the act of responding or traveling to an alarm or request for assistance.

Risk assessment: To set or determine the possibility of suffering harm or loss, and to what extent.

Safe and healthful working environment: The work surroundings of an employee with minimum exposure to unsafe acts and/or unsafe conditions.

Safety officer: Either the fire department safety officer or an assistant safety officer (see fire department safety officer).

Safety net: A rope or nylon strap net not to exceed 6-inch mesh, stretched and suspended above ground level at the base of drill tower, and at such a height that a falling body would be arrested prior to striking the ground.

Scabbard: A guard which will prevent accidental injury and covers the blade and pick of an axe or other sharp instrument when worn by the fire fighter.

SCBA: Self contained breathing apparatus.

Service testing: The regular, periodic inspection and testing of apparatus and equipment according to an established schedule and procedure, to insure that it is in safe and functional operating condition.

Shall: Mandatory.

Should: Recommended.

Signalman: A person so positioned that he/she can direct the driver when the drivers vision is obstructed or obscured.

SOP: Standard operating procedure or guidelines.

Staffed station: A fire station continuously occupied by fire fighters on scheduled work shifts. The staffed station may also serve as headquarters for volunteers.

Standard operating procedure or guidelines: An organizational directive that establishes a standard course of action. See SOP.

Station (fire station): Structure in which fire service apparatus and/or personnel are housed.

Structural fire fighting: The activities of rescuing, fire suppression, and property conservation involving buildings, enclosed structures, vehicles, vessels, or similar properties that are involved in a fire or emergency situation.

Structural fire fighting protective clothing: This category of clothing, often called turnout or bunker gear, means the protective clothing normally worn by fire fighters during structural fire fighting operations. It includes a helmet, coat, pants, boots, gloves, and a hood. Structural fire fighters' protective clothing provides limited protection

from heat but may not provide adequate protection from the harmful gases, vapors, liquids, or dusts that are encountered during hazardous materials incidents.

Support function: A hazardous chemical operation involving controlled chemical uses or exposures in nonflammable atmospheres with minimum threats in loss of life, personnel injury, or damage to property or to the environment. Functions include decontamination, remedial cleanup of identified chemicals, and training.

Support function protective garment: A chemical-protective suit that meets the requirements of NFPA Standard on Support Function Garments, 1993.

Tail/running board: Standing space on the side or rear of an engine or pumper apparatus.

Team: Two or more individuals who are working together in positive communication with each other through visual, audible, physical, safety guide rope, electronic, or other means to coordinate their activities and who are in close proximity to each other to provide assistance in case of emergency.

Tillerman: Rear driver of tractor-trailer aerial ladder.

Trench: A narrow excavation made below the surface of the ground. The depth is generally greater than the width, but the width of a trench is not greater than 15 feet.

Turnout clothing: See structural fire fighting protective clothing.

Turntable: The rotating surface located at the base of an aerial ladder, or boom, on aerial apparatus.

Universal precaution: An approach to infection control. According to the concept of universal precautions, all human blood and certain human body fluids are treated as if known to be infectious for HIV, HBV, and other bloodborne pathogens.

Vapor barrier: Material used to prevent or substantially inhibit the transfer of water, corrosive liquids and steam or other hot vapors from the outside of a garment to the wearer's body.

Variance: An allowed or authorized deviation from specific standard(s) when an employer substitutes measures which afford an equal degree of safety. Variances are issued as temporary or permanent with interim measures issued, when requested, until a determination or decision is made.

Vessel: Means every description of watercraft or other artificial contrivance used or capable of being used as a means of transportation on water, including special-purpose floating structures not primarily designed for or used as a means of transportation on water.

WAC: Washington Administrative Code.

Wheel blocks (chocks): A block or wedge placed under a wheel to prevent motion.

Wildfire: An unplanned and unwanted fire requiring suppression action; an uncontrolled fire, usually spreading through vegetative fuels and often threatening structures.

Wildland fire: A fire burning in natural vegetation that requires an individual or crew(s) to expend more than one hour of labor to confine, control and extinguish. Agencies may substitute crews to avoid the one hour bench mark or increase crew size to complete the job in less than one hour. One hour was chosen as the maximum time that individuals should work in high temperatures in structural protective clothing.

Wildland fire fighting enclosure: A fire apparatus enclosure with a minimum of three sides and a bottom.

WISHA: Washington Industrial Safety Health Act.

Work environment: The surrounding conditions, influences or forces to which an employee is exposed while working.

Workplace: See place of employment.

WRD: WISHA regional directive.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-01005, filed 5/10/96, effective 1/1/97.]

WAC 296-305-01007 Variance and procedure. (1) Conditions may exist in operations that a state standard will not have practical use. The director may issue a variance from the requirements of the standard when another means of providing equal protection is provided.

(2) Applications for variances will be reviewed and investigated by the department. Variances granted shall be limited to the specific WAC code covered in the application and may be revoked for cause. The variance shall remain prominently posted on the premises while in effect.

Note: Variance forms may be obtained from the department upon request. Requests for variance from safety and health standards shall be made in writing to the assistant director, Consultation and Compliance Services Division, Department of Labor and Industries, P.O. Box 44600, Olympia, Washington 98504-4600. (Reference RCW 49.17.080 and 49.17.090.)

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-01007, filed 5/10/96, effective 1/1/97.]

WAC 296-305-01009 Appeals. Any party authorized to appeal from an action of the department as set forth in RCW 49.17.140(3), may do so by filing a notice of appeal in writing. The appeal must contain the recommended subject matter, as noted below, by serving a copy of such notice of appeal either in person or by mail upon the assistant director of the Consultation and Compliance Services Division, (7273 Linderson Way, Tumwater, Washington) P.O. Box 44600, Olympia, Washington 98504-4600. The appeal must be sent to the department within fifteen working days of the communication of the notice.

The notice of appeal should contain:

(1) The name and address of the appealing party and his/her representative if any;

(2) The place where the alleged safety violation occurred;

(3) A statement identifying the order, decision or citation appealed from, by report number and date of issuance;

(4) The grounds upon which the appealing party considers such order, decision, or citation to be unjust or unlawful;

(5) A statement of facts in support of each grounds stated;

(6) The relief sought, including the specific nature and extent;

(7) A statement that the person signing the notice of appeal has read it and to the best of his/her knowledge, information and belief there is good ground to support it. A notice of appeal may be signed by the party or by his/her authorized representative.

References:

WAC 296-350-030, Notice of appeal—Filing and service.

WAC 296-350-040, Notice of appeal—Contents RCW 49.17.140(3).

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-01009, filed 5/10/96, effective 1/1/97.]

WAC 296-305-01501 Injury and illness reports for fire fighters. (1) Notice of injury or illness.

(a) Whenever an occupational accident causes injury or illness to a fire fighter or other employee, or whenever a fire fighter or other employee becomes aware of an illness apparently caused by occupational exposure, it shall be the duty of such a fire fighter or other employee, or someone on his/her behalf, to report the injury or illness to the employer before the end of his/her duty period but not later than twenty-four hours after the incident.

(b) Exception: In the event that symptoms of an occupational injury or illness are not apparent at the time of the incident, the employee shall report the symptoms to his/her employer within forty-eight hours after becoming aware of the injury or illness.

(c) Within eight hours after the fatality or probable fatality of any fire fighter or employee from a work-related incident or the inpatient hospitalization of two or more employees as a result of a work-related incident, the employer of any employees so affected, shall orally report the fatality/multiple hospitalization by telephone or in person, to the nearest office of the department or by using the OSHA toll-free central telephone number, 1-800-321-6742.

(i) This requirement applies to each such fatality or hospitalization of two or more employees which occurs within thirty days of the incident.

(ii) Exception: If any employer does not learn of a reportable incident at the time it occurs and the incident would otherwise be reportable under this subsection, the employer shall make a report within eight hours of the time the incident is reported to any agent or employee of the employer.

(iii) Each report required by this subsection shall relate the following information: Establishment name, location of the incident, time of the incident, number of fatalities or hospitalized employees, contact person, phone number, and a brief description of the incident.

(2) Recordkeeping - written reports; all fire service employers shall maintain records of occupational injuries and illnesses. Reportable cases include every occupational death, every occupational illness, or each injury that involves one of the following: Unconsciousness, inability to perform all phases of regular duty-related assignment, inability to work full time on duty, temporary assignment, or medical treatment beyond first-aid.

(3) All fire departments shall record occupational injury and illnesses on forms OSHA 101-Supplementary Record Occupational Injuries and Illnesses and OSHA 200-Log summary. Forms other than OSHA 101 may be substituted for the Supplementary Record of Occupational Injuries and Illnesses if they contain the same items.

(4) Each employer shall post an annual summary of occupational injuries and illnesses for each establishment. This summary shall consist of a copy of the year's totals

from the Form OSHA No. 200 and the following information from that form: Calendar year covered, company name, establishment name, establishment address, certification signature, title, and date. A Form OSHA No. 200 shall be used in presenting the summary. If no injuries or illnesses occurred in the year, zeros must be entered on the totals line, and the form must be posted. The summary shall be completed by February 1 each calendar year. The summary covering the previous calendar year shall be posted no later than February 1, and shall remain in place until March 1.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-01501, filed 5/10/96, effective 1/1/97.]

WAC 296-305-01503 Accident investigation. (1) After the emergency actions following accidents that cause serious injuries that have immediate symptoms, a preliminary investigation of the cause of the accident shall be conducted. The investigation shall be conducted by a person designated by the employer. The fire department shall establish a written procedure and a program for investigating, and evaluating the facts, relating to the cause of accidents. The findings of the investigation shall be documented by the employer for reference at any following formal investigations.

(2) Within eight hours after the fatality or probable fatality of any fire fighter or employee from a work-related incident or the inpatient hospitalization of two or more employees as a result of a work-related incident, the employer of any employees so affected, shall orally report the fatality/multiple hospitalization by telephone or in person, to the nearest office of the department or by using the OSHA toll-free central telephone number, 1-800-321-6742.

(3) Equipment involved in an accident resulting in an immediate or probable fatality, shall not be moved, until a representative of the consultation and compliance services division investigates the accident and releases such equipment, except where removal is essential to prevent further accident. When necessary to remove the victim, such equipment may be moved only to the extent of making possible such removal.

(4) Upon arrival of the department's investigator, the employer shall assign to assist the investigator such personnel as are deemed necessary by the department to conduct the investigation.

(5) The fire department shall preserve all records, photographic materials, audio, video, recordings, or other documentation concerning an accident.

Reference: WAC 296-24-020 (2), (3).

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-01503, filed 5/10/96, effective 1/1/97.]

WAC 296-305-01505 Accident prevention program.

(1) All fire departments shall develop and implement a written safety program.

(2) Fire department safety programs shall have an assigned safety officer.

(3) Each employer shall develop a formal accident-prevention program, tailored to the needs of the fire department and to the type of hazards involved. The department of labor and industries' consultation and compliance services

division may be contacted for assistance in developing appropriate programs.

(a) A safety orientation program describing the employer's safety program shall include:

(i) How and when to report injuries, including instruction as to the location of first-aid facilities.

(ii) How to report unsafe conditions and practices.

(iii) The use and care of required personal protective equipment.

(iv) The proper actions to take in event of emergencies including the routes of exiting from areas during emergencies.

(v) Identification of the hazardous gases, chemicals or materials involved, along with the instructions on the safe use and emergency action following accidental exposure.

(vi) A description of the employer's total safety program.

(vii) An on-the-job review of the practices necessary to perform the initial job assignments in a safe manner.

(4) Fire departments shall have a safety committee to serve in an advisory capacity to the fire chief. The number of employer-selected members shall not exceed the number of employee-elected members.

(5) The frequency of safety meetings shall be determined by the safety committee, but shall not be less than one hour per calendar quarter, however, special meetings may be held at the request of either party.

(6) Minutes shall be taken of all safety meetings. After review by the chief or his/her designee the minutes shall be conspicuously posted at all stations.

(7) Employee submitted written suggestions or complaints shall be considered. Action recommendations by the committee shall be transmitted in writing to the fire chief. The chief or his/her designated agent will reply to the submitter.

(8) Inspections of fire stations shall be made at least monthly and records maintained to ensure that stations are reasonably free of recognized hazards. These inspections shall include, but not be limited to, tools, apparatus, extinguishers, protective equipment, and life safety equipment.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-01505, filed 5/10/96, effective 1/1/97.]

WAC 296-305-01507 Fire department safety officer.

(1) The duties and responsibilities of the fire department safety officer shall include, but are not limited to:

(a) Plan and coordinate safety activities.

(b) Work closely with the safety committee.

(c) Ensure accidents are investigated.

(d) Devise corrective measures to prevent accidents.

(2) Realizing safety training and recordkeeping are management's responsibility, the fire department safety officer shall ensure the following requirements are being met:

(a) Ensure safety training for all employees.

(b) Ensure safety directives are complied with.

(c) Ensure that records are kept, but not limited to the following:

(i) Accidents

(ii) Injuries

- (iii) Inspections
- (iv) Exposures
- (v) Medical Monitoring
- (vi) Safety meetings
- (vii) Apparatus
- (viii) Equipment
- (ix) Protective clothing
- (x) Other fire department safety activities

(3) The fire department safety officer, through the fire chief, shall have the authority and responsibility to identify and recommend correction of safety and health hazards.

(4) The fire department safety officer shall maintain a liaison with staff officers regarding recommended changes in equipment, procedures, and recommended methods to eliminate unsafe practices and reduce existing hazardous conditions.

Additional Reference: NFPA 1521 Standard for Fire Department Safety Officer, may be used as a guide for duties and responsibilities relating to the safety officer.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-01507, filed 5/10/96, effective 1/1/97.]

WAC 296-305-01509 Management's responsibility.

(1) It shall be the responsibility of management to establish, supervise, maintain, and enforce, in a manner which is effective in practice:

(a) A safe and healthful working environment, as it applies to noncombat conditions or to combat conditions at a fire scene after the fire has been extinguished, as determined by the officer in charge.

(b) An accident prevention program as required by this chapter.

(c) Programs for training employees in the fundamentals of accident prevention.

(d) Procedures to be used by the fire department safety officer and incident commander to ensure that emergency medical care is provided for members on duty.

(e) An accident investigation program as required by this chapter.

(2) The fire department shall be responsible for providing suitable expertise to comply with all testing requirements in this chapter. Such expertise may be secured from within the fire department, from equipment and apparatus manufacturers, or other suitable sources.

(3) Members who are under the influence of alcohol or drugs shall not participate in any fire department operations or other functions. This rule does not apply to persons taking prescription drugs as directed by a physician or dentist providing such use does not endanger the worker or others.

(4) Alcoholic beverages shall not be allowed in station houses, except at those times when station houses are used as community centers, with the approval of management.

(5) A bulletin board or posting area exclusively for safety and health and large enough to display the required safety and health posters. The WISHA poster (WISHA form F416-081-000) and other safety education material shall be provided. A bulletin board of "white background" and "green trim" is recommended.

(6) The fire department shall develop and maintain a hazard communication program as required by chapter 296-

62 WAC, Part C, which will provide information to all employees relative to hazardous chemicals or substances to which they are exposed, or may routinely be exposed to, in the course of their employment.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-01509, filed 5/10/96, effective 1/1/97.]

WAC 296-305-01511 Employee's responsibility. (1)

Fire fighters shall cooperate with the employer and other employees in efforts to eliminate accidents.

(2) Each fire fighter or other employee shall comply with the provisions of this chapter which are applicable to his/her own actions and conduct in the course of his/her employment.

(3) Fire fighters and other employees shall notify the appropriate employer representative of unsafe work practices and of unsafe conditions of equipment, apparatus, or work places.

(4) Fire fighters and other employees shall apply the principles of accident prevention in their work. They shall use all required safety devices, protective equipment, and safety practices, as provided and/or developed by management.

(5) Each fire fighter shall take proper care of all personal protective equipment.

(6) Fire fighters shall attend, when on duty, required training and/or orientation programs designed to increase their competency in occupational safety and health.

(7) Fire fighters who are under the influence of alcohol or drugs shall not participate in any fire department operations or other functions. This rule does not apply to persons taking prescription drugs as directed by a physician or dentist providing such use does not endanger the worker or others.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-01511, filed 5/10/96, effective 1/1/97.]

WAC 296-305-01513 Safe place standards. (1)

Every employer shall furnish and require the use of appropriate safety devices and safeguards. All fire fighting methods, and operations shall be so designed as to promote the safety and health of employees. The employer shall do everything reasonably necessary to protect the safety and health of employees.

(2) No fire fighter or other employee, employer or employer representative shall:

(a) Remove, displace, damage, destroy or carry off any safety device, safeguard, notice or warning furnished for use in any employment or place of employment.

(b) Interfere in any way with the use of any safety device, method or process adopted for the protection of any employee.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-01513, filed 5/10/96, effective 1/1/97.]

WAC 296-305-01515 First-aid training and certification. (1)

All fire fighters except directors of fire departments and the directors' designated personnel, shall have as a minimum first-aid training as evidenced by a current, valid first-aid card, EMT or First Responder certification.

(2) New fire fighters shall have such first-aid training within 90 days of the date of their employment or enroll for training in the next available class for which they are eligible.

(3) First-aid training and certification for other employees and directors of fire departments shall conform to the requirements of chapter 296-24 WAC, Part A-1.

(4) Fire service duties include exposure to bloodborne pathogens. The requirements of this section and chapter 296-62 WAC, Part J, Biological Agents, shall apply.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-01515, filed 5/10/96, effective 1/1/97.]

WAC 296-305-01517 First-aid kits. (1) To assure the emergency medical care of the fire fighters there shall be present at each emergency incident at least the following items:

- 1 (one) utility scissors, EMT-type
- 1 CPR barrier
- 3 (three) rolls 1 inch adhesive tape
- 6 (six) 4" x 4" sterile, individually wrapped gauze pads
- 4 (four) combination pads, sterile, individually wrapped
- 4 (four) soft roller bandages, assorted size, sterile, individually wrapped cling type
- 2 (two) burn sheets, sterile, individually wrapped
- 2 (two) triangular bandages
- 1 (one) multi-trauma dressing, sterile
- 2 (two) supply disposable gloves
- 2 (two) wire splints or equivalent
- (2) All fire stations shall maintain a first-aid kit. The kit shall contain at least the following items:
 - 6 (six) 4" x 4" sterile, individually wrapped gauze pads
 - 4 (four) combination pads, sterile, individually wrapped
 - 2 (two) rolls 1 inch adhesive tape
 - 4 (four) soft roller bandages, assorted size, sterile, individually wrapped cling type
 - 2 (two) triangular bandages
 - 1 (one) utility scissors, EMT-type
 - 1 (one) pair tweezers
 - 1 (one) package assorted adhesive bandages
- (3) All fire apparatus shall contain a first-aid kit as described in chapter 296-24 WAC, Part A-1.
- (4) All fire departments providing emergency medical services to the public shall conform to the requirements of chapter 18.73 RCW Emergency Care and Transportation Services (and if applicable, chapter 248-17 WAC, Ambulance Rules and Regulations) which require additional first-aid equipment.

Additional references: Chapter 294-24 WAC, Part A-1.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-01517, filed 5/10/96, effective 1/1/97.]

WAC 296-305-02001 Personal protective equipment and protective clothing.

Note: For wildland fire fighting personal protective equipment and clothing requirements see WAC 296-305-07003, Personal protective clothing and equipment for wildland fire fighting.

(1) Employers shall provide and maintain at no cost to the employee the appropriate protective ensemble/protective clothing to protect from the hazards to which the member is or is likely to be exposed. Employers shall ensure the use

of all protective equipment and clothing required by this standard. Employers shall assure that the protective clothing and equipment ordered or purchased after the effective date of this standard meets the requirements of this standard. Full protective equipment designated for the task, shall be worn for all department activities.

(2) Fire fighters shall be trained in the function, donning and doffing, care, use, inspection, maintenance and limitations of the protective equipment assigned to them or available for their use.

(3) Protective clothing and protective equipment shall be used and maintained in accordance with manufacturer's instructions. A written maintenance, repair, retirement, servicing, and inspection program shall be established for protective clothing and equipment. Specific responsibilities shall be assigned for inspection and maintenance. This requirement applies to fire fighter's personally owned equipment as well as equipment issued by the employer.

(4) The fire department shall provide for the cleaning of protective clothing and contaminated station/work uniforms at no cost to the employee. Such cleaning shall be performed by either a cleaning service, or at a fire department facility, that is equipped to handle contaminated clothing.

Note: See Appendix A.

(5) Personal protective equipment and clothing shall be of a type specified by NIOSH, MSHA, NFPA, ANSI, or as specifically referenced in the appropriate section of this chapter.

(6) Station/work uniforms. Station/work uniforms are not themselves intended as primary protective garments.

(a) Station/work uniforms if provided, shall meet the requirements as specified in NFPA 1975, 1990 edition.

(b) All station/work uniforms purchased after the effective date of this regulation shall meet the requirements set forth in this standard.

(c) Station/work uniforms include trousers, and/or coveralls, but exclude shirts, underwear, and socks.

(d) Members shall not wear any clothing that is determined to be unsafe due to poor thermal stability or poor flame resistance when engaged in or exposed to the hazards of structural fire fighting. Because it is impossible to ensure that every member will respond to an incident in a station/work uniform or will change out of fabrics that have poor thermal stability or ignite easily, before donning protective garments, the fire department shall inform members of the hazards of fabrics that melt, drip, burn, stick to the skin and cause burns to the wearer due to poor thermal stability or poor flame resistance.

(e) Garments meeting the requirements of WAC 296-305-07003(1), meet the intent of this section.

(f) Station/work uniforms purchased prior to the effective date of this chapter shall be acceptable for a period of two years or until the employers current inventory has been exhausted, whichever comes first.

(7) Turnout clothing/pants and coat:

Proximity clothing:

(a) All turnout clothing used as proximity clothing shall meet the requirements of NFPA, 1976 Standard on Protective Clothing for Proximity Fire Fighting, 1992 edition.

(b) There shall be at least a two-inch overlap of all layers of the protective coat and the protective trousers so

there is no gaping of the total thermal protection when the protective garments are worn. The minimum overlap shall be determined by measuring the garments on the wearer, without SCBA, with the wearer in the most stretched position, hands together reaching overhead as high as possible.

(c) Single piece protective coveralls shall not be required to have an overlap of all layers as long as there is continuous full thermal protection.

(d) Fire departments that provide protective coats with protective resilient wristlets secured through a thumb opening may provide gloves of the gauntlet type for use with these protective coats. Fire departments that do not provide such wristlets attached to all protective coats shall provide gloves of the wristlet type for use with these protective coats.

(e) Where the SCBA is worn over or outside the proximity protective garment, the fire department shall inform the member of the potential high levels of radiant heat that may result in the failure of the SCBA. The fire department shall require additional approved radiant reflective criteria, including but not limited to a protective cover, for the expected proximity fire fighting exposures when the SCBA is worn over or outside the proximity protective garment.

(8) Structural fire fighting clothing.

(a) All turnout clothing purchased after the effective date of these regulations shall meet the requirements of NFPA, Standard on Protective Clothing for Structural Fire Fighting 1971, 1991 edition. In no case, shall fire fighters wear personal protective clothing manufactured prior to the 1986 edition, NFPA, Standard on Protective Clothing for Structural Fire Fighting 1971.

(b) Turnout clothing shall be maintained as specified by the manufacturer.

(c) Repairs to turnout clothing shall be done to the manufacturers specification by qualified individuals approved by the manufacturer. Repairs must be made using materials and methods in accordance with the applicable standards under which the article was produced. Repairs include any and all alterations, modifications, additions, deletions or any other change made to the manufacturers PPE article.

(d) Turnout clothing which is damaged or does not comply with this section shall not be used.

(e) All turnout clothing shall be inspected semi-annually by an individual qualified by the employer. Inspection intervals shall not exceed six months.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-02001, filed 5/10/96, effective 1/1/97.]

WAC 296-305-02003 Eye and face protection. (1) Face and eye protection shall be provided for and used by fire fighters engaged in fire suppression and other operations involving hazards to the eye and face at all times when the face is not protected by the full facepiece of the SCBA.

(2) Persons whose vision requires the use of corrective lenses in spectacles, and who are required by this standard to wear eye protection, shall wear goggles or spectacles of one of the following types:

(a) Spectacles with protective lenses that provide optical correction.

(b) Goggles that can be worn over corrective spectacles without disturbing the adjustment of the spectacles.

(c) Goggles that incorporate corrective lenses mounted behind the protective lens.

(3) When limitations or precautions are indicated by the manufacturer, they shall be transmitted to the user and care taken to see such limitations and precautions are strictly observed.

(4) Care, use, and maintenance for any type of eye or face protection shall follow the manufacturers suggested recommendations.

(5) Goggles shall be inspected, cleaned and disinfected prior to being reissued to other employees.

Note: The helmet face shield alone does not always provide adequate eye protection against flying particles, splash, gases and vapors. For known eye hazards, such as, but not limited to, cutting with power saws, chopping, drilling and using extrication equipment, the face shield should be worn with additional eye protection.

(6) Helmet face shields shall meet the requirements of NFPA, Standard Helmets for Structural Fire Fighting 1972, 1992 edition.

(7) For fire fighters that do not have a helmet face shield for eye and face protection, flexible or cushioned fitting goggles shall be provided.

(8) Goggles shall consist of a wholly flexible frame, forming a lens holder or a rigid frame with integral lens or lenses, having a separate, cushioned fitting surface on the full periphery of the facial contact area.

(a) Materials used shall be chemical-resistant, nontoxic, nonirritating and slow burning.

(b) There shall be a positive means of support on the face, such as an adjustable headband of suitable material or other appropriate means of support to retain the frame comfortable and snugly in front of the eyes.

(c) Goggles shall meet the requirements of ANSI Z87.1.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-02003, filed 5/10/96, effective 1/1/97.]

WAC 296-305-02005 Hearing protection. (1) Fire departments shall administer a continuing effective hearing conservation program, as described in chapter 296-62 WAC, Part K, Hearing Conservation, except for WAC 296-62-09031 (2)(b), whenever employees noise exposure equal or exceed an eight-hour time-weighted average (TWA) sound level of 85 decibels (dBA) measured on the A scale weighing at slow response or, equivalently, a noise dose of fifty percent.

(2) For the purpose of a hearing conservation program, employee noise exposure shall be computed in accordance with WAC 296-62-09055, Appendix E, Noise exposure computation, without regard to any attenuation provided by the use of personal protective equipment.

(3) The hearing conservation program shall be provided at no cost to the employee.

(4) Hearing protection shall be provided for and used by all members when exposed to an eight-hour time weighted average of 85 dBA or greater or when exposed to noise in excess of 115 dBA from power tools, engine warm ups, drafting, or other such activities, except in situations where the use of such protective equipment would create an additional hazard to the user such as in fire suppression.

(5) Audiometric test shall be performed by a licensed or certified audiologist, otolaryngologist, or other qualified physician, or by a technician who is certified by the council of accreditation in occupational hearing conservation. A technician who performs audiometric tests must be responsible to an audiologist, otolaryngologist or other qualified physician.

(6) The fire department shall institute a hearing conservation training program for all employees and shall ensure their participation in such programs, meeting the minimum requirements specified in chapter 296-62 WAC, Part K.

(7) The use of personal protective equipment to limit noise exposure shall be considered as an interim approach until the noise levels produced by vehicles, warning devices, and radios can be reduced. Protective muffs are recommended for fire fighters, due to the difficulties of proper fit and insertion of ear plugs.

(8) Noise levels in new fire apparatus purchased after the effective date of this chapter, shall not exceed at any seated position to be a maximum of 90 dBA when measured, as specified in this section, without any warning device in operation.

(a) Interior noise levels shall be measured with the vehicle in motion at the speed that produces the highest noise level, up to 55 mph.

(b) All windows should be closed and the noise level shall be measured in each passenger area.

(c) For existing apparatus, compliance with this section will be required within two years of the effective date of this chapter.

Note: In order to reduce noise levels, the following engineering controls may achieve such a reduction:

- a. Move siren speakers and air horns down onto the front bumper.
- b. Respond with windows closed.
- c. Install sound-attenuating insulation in cabs of apparatus.
- d. Lower the pitch of siren and air horns.
- e. Improve radio equipment with higher clarity and less output volume.

(9) For existing fire apparatus that cannot be brought into compliance, the employer shall be required to provide members with hearing protectors.

(10) The fire department shall provide training in the use and care of all hearing protectors provided to employees.

(11) The training program shall be repeated annually for each employee included in the hearing conservation program.

(12) Information provided in the training program shall be updated to be consistent with changes in protective equipment and work processes.

Additional References: Chapter 296-62 WAC, Part K.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-02005, filed 5/10/96, effective 1/1/97.]

WAC 296-305-02007 Hand protection. (1) Fire fighters' gloves shall when worn with turnout clothing, provide protection to the wrist area. In turnout clothing where wristlet protection is not provided fire fighters' gloves shall be closed at the top.

(2) Fire departments shall establish written policy and procedure for the care, use, cleaning, replacement and/or retirement criteria, and maintenance of gloves issued.

(3) Gloves purchased after the effective date of this chapter shall comply with this section.

(4) Fire fighters' gloves used during structural fire fighting operations including rescue of victims from fires, and emergency medical operations where sharp or rough surfaces are likely to be encountered such as victim extractions shall meet the requirements of NFPA, Standard on Gloves for Structural Fire Fighting 1973, 1993 edition.

(5) Fire fighters gloves are not designed to provide protection to all environments. For gloves desired to fill the needs of a specific requirement see that specific section of this chapter. It is the intent of this section to provide protection from intrusion throughout the glove body by certain common chemicals, and from bloodborne pathogens. Fire departments shall consult the manufacturer's recommendation.

Note: Fire fighters should have their hands sized for compliance with the sizing chart as specified in NFPA, Standard on Gloves for Structural Fire Fighting 1973, 1993 edition.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-02007, filed 5/10/96, effective 1/1/97.]

WAC 296-305-02009 Body protection. (1) Body protection shall be coordinated with torso, hand, head, foot, respiratory, and face protection as outlined in WAC 296-305-02001 through 296-305-02019.

(2) Fire departments shall establish written procedures for the use of components of any or all portions of protective equipment.

(3) Fire departments that provide structural and wildfire suppression shall establish written procedures for the use of protective clothing on structural and wildfire suppression activities.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-02009, filed 5/10/96, effective 1/1/97.]

WAC 296-305-02011 Body armor. Fire departments that use protective body armor shall comply with the following:

(1) The fire department shall develop and have in place written guidelines for the care, use and maintenance of the protective body armor in conjunction with the manufacturer's recommendations.

(2) All protective body armor shall meet or exceed National Institute of Justice NIF 0101.03, Threat Level II requirements, April 1987 edition, which is incorporated by reference (or shall be demonstrated by the employer to be equally effective), for both wet and dry ballistic performance.

(3) Body armor shall be correctly fitted following the manufacturer's recommendations and shall not be used beyond the manufacturer's warranty.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-02011, filed 5/10/96, effective 1/1/97.]

WAC 296-305-02013 Foot protection for structural fire fighting. (1) Protective footwear purchased after the effective date of this standard shall comply with NFPA 1974, Standard on Protective Footwear for Structural Fire Fighting, 1992 edition.

(2) Fire departments shall establish written policy and procedure, care, use, maintenance, and retirement criteria for

footwear in conjunction with the manufacturer's recommendations.

Note: Fire departments should establish cleaning and drying instruction including applicable warning regarding detergents, soaps, cleaning additives and bleaches for protective footwear.

(3) Fire fighter footwear may be resoled but the footwear upon resoling shall meet the requirements specified in this section.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-02013, filed 5/10/96, effective 1/1/97.]

WAC 296-305-02015 Head protection. (1) Fire fighters who engage in or are exposed to the hazards of structural fire fighting shall be provided with and use helmets that meet the requirements of NFPA 1972, Standard on Helmets for Structural Fire Fighting, 1987 edition.

(2) Helmets purchased thirty days after the adoption of this chapter shall meet the requirements of NFPA, Standard on Helmets for Structural Fire Fighting 1972, 1992 edition.

(3) Fire departments shall establish a written policy and procedure for the care, use, maintenance, and retirement criteria for helmets.

(4) Helmets shall be provided with face shields or goggles.

(5) Helmet accessories shall not interfere with the function of the helmet or its components parts and shall not degrade the helmets performance.

(6) Helmets shall be maintained in accordance with the manufacturer's recommendations. No modifications shall be made without prior written approval from the manufacturer.

(7) Fire fighters shall follow the manufacturer's recommendations regarding cleaning, painting, marking, storage, and frequency and details of inspection.

Note: Helmets should be stored at room temperature and out of direct sunlight.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-02015, filed 5/10/96, effective 1/1/97.]

WAC 296-305-02017 Personal alert safety system (PASS) protection. (1) Each fire fighter working in a hazardous area requiring the use of SCBA shall wear and use a PASS device. PASS devices shall meet the requirements of NFPA, Standard on Personal Alert Safety Systems (PASS) for Fire Fighters 1982, 1993 edition. (See WAC 296-305-07001 through 296-305-07019 for wildland fire fighting application.)

(2) Each PASS device shall be tested routinely to ensure it is ready for use and immediately prior to each use, and shall be maintained in accordance with the manufacturers' instructions.

(3) Fire departments shall provide written procedures for the use of PASS devices.

(4) Compliance with this section shall occur no later than two years after the effective date of this chapter.

Note: Fire departments should provide one spare PASS device for each ten units in service. If a department has less than ten devices they should have one spare.

(5) Fire departments shall establish a written procedure for the care, use, maintenance, and repair of PASS devices in conjunction with manufacturer's recommendations.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-02017, filed 5/10/96, effective 1/1/97.]

WAC 296-305-02019 Life safety ropes, harnesses, and hardware protection. (1) All life safety ropes, harnesses, and hardware used by fire departments shall meet the applicable requirements of NFPA 1983, Standard on Fire Service Life Safety Rope, Harness, and Hardware, 1990 edition.

(2) Ropes used to support the weight of members or other persons during rescue, fire fighting, other emergency operations, or during training evolutions shall be life safety rope.

(3) Life safety rope used for rescue at fires, or other emergency incidents, or for training, shall be permitted to be reused if inspected before, and after, each such use in accordance with the manufacturer's instructions and provided:

(a) The rope has not been visually damaged by the exposure to heat, direct flame impingement, chemical exposure, or abrasion.

(b) The rope has not been subjected to any impact load.

(c) The rope has not been exposed to chemical liquids, solids, gases, mists, or vapors of any materials, known to deteriorate rope.

(d) If the rope used for rescue at fires or other emergency incidents, or for training, has been subjected to (a), (b), or (c) of this section, or fails the visual inspection, it shall be destroyed after such use.

(e) If there is any question regarding the serviceability of the rope after consideration of the above, the safe course of action shall be taken and the rope shall be placed out of service. See Appendix B.

(f) Rope inspection shall be conducted by qualified inspectors in accordance with rope inspection procedures established and recommended as adequate by the rope manufacturer to assure rope is suitable for reuse.

(4) Fire departments shall establish written procedures for the use of life safety ropes and rescue operations utilizing harnesses and ropes.

(5) Records shall provide a history of each life safety and training rope. The minimum information to be reflected in the record of history of life safety and training ropes shall include: Date of manufacturer, organization serial number, use list to include inspectors name and space for comments.

(6) Rope used for training evolutions shall be designated as training rope and shall be permitted to be reused if inspected before and after each use in accordance with the manufacturer's instructions.

(7) The destruction of a rope means that it shall be removed from service and altered in such a manner that it could not be mistakenly used as a life safety rope. This includes disposal or removal of labels and cutting into short lengths to be used for utility purposes.

(8) All repairs to life safety harnesses shall be done by an authorized manufacturer's representative, or the manufacturer.

Note: See WAC 296-305-06003 (3), (4), (5), and (6) for the testing of life belts, ropes, and harnesses.

(9) Class I safety harnesses shall be used for fire fighter attachment to ladders and aerial devices.

(10) Class II and Class III life safety harnesses shall be utilized for fall arrest and rappelling operations.

(11) Rescue ropes shall be padded when deployed over edges or rough surfaces.

Note: See WAC 296-305-05005 for rope rescue applications.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-02019, filed 5/10/96, effective 1/1/97.]

WAC 296-305-02501 Emergency medical protection.

(1) Fire fighters who perform emergency medical care or otherwise may be exposed to blood or other body fluids shall be provided with emergency medical face protection devices, and emergency medical garments that meet the applicable requirements of NFPA, Standard on Protective Clothing for Emergency Medical Operations 1999, 1992 edition.

Note: Prior to purchase, fire departments should request the technical data package required in NFPA 1999, 1992 edition, in order to compare glove and garment performance data. Departments reviewing these packages should ensure a relative ranking of the performance data before they purchase in order to provide the best performance of the EMS personal protective clothing.

(2) Fire fighters shall don emergency medical gloves prior to initiating any emergency patient care.

(3) Fire fighters shall don emergency medical garments and emergency medical face protection devices prior to any patient care during which splashes of body fluids can occur such as situations involving spurting blood or childbirth.

Note: Fire fighter turnout gear and gloves with vapor barriers may be used in lieu of emergency medical gloves and garments.

(4) Contaminated emergency medical garments, emergency medical face protection, gloves, devices, and emergency medical gloves shall be cleaned and disinfected, or disposed of, in accordance with WAC 296-62-08001, Part J, Bloodborne pathogens.

(5) Fire departments shall establish a designated infection (exposure) control officer who shall ensure that an adequate infection control plan is developed and all personnel are trained and supervised on the plan.

(6) The infection control officer shall be responsible for establishing personnel exposure protocols so that a process for dealing with exposures is in writing and available to all personnel.

(7) The infection control officer or his/her designee will function as a liaison between area hospitals and fire department members to provide notification that a communicable disease exposure is suspected or has been determined by hospital medical personnel. The department infection control officer will institute the established exposure protocols immediately after report of an exposure. The infection control officer shall follow the confidentiality requirements of chapter 246-100 WAC and the medical protocol requirements of WAC 296-62-05209.

(8) Fire departments shall have a written infection (exposure) control plan which clearly explains the intent, benefits, and purpose of the plan. The written document must cover the standards of exposure control such as establishing the infection control officer and all members affected; education and training; HBV vaccination requirements; documentation and record keeping; cleaning/disinfection of personnel and equipment; and exposure protocols.

(9) Policy statements and standard operating procedure guidelines shall provide general guidance and specific regulation of daily activities. Procedures shall include delegation of specific roles and responsibilities, such as regulation of infection control, as well as procedural guidelines for all required tasks and functions.

(10) Fire departments shall establish a records system for members health and training.

(11) Fire fighters shall be trained in the proper use of PPE, exposure protection, post exposure protocols, disease modes of transmission as it related to infectious diseases.

(12) Infectious disease programs shall have a process for monitoring fire fighters compliance with established guidelines and a means for correcting noncompliance.

(13) Fire department members shall be required to annually review the infectious disease plan, updates, protocols, and equipment used in the program.

(14) Fire departments shall comply with WAC 296-62-08001, Part J, Bloodborne pathogens, in its entirety.

(15) Tuberculosis (TB) exposure and respiratory protection requirements.

(a) Fire fighters shall wear a particulate respirator (PR) when entering areas occupied by individuals with suspected or confirmed TB, when performing high risk procedures on such individuals or when transporting individuals with suspected or confirmed TB in a closed vehicle.

(b) A NIOSH-approved, 95% efficient particulate air respirator is the minimum acceptable level of respiratory protection.

(i) Fit tests are required.

(ii) Fit tests shall be done by procedures recommended by the respirator manufacturer or the department.

Note 1: Emergency-response personnel should be routinely screened for tuberculosis at regular intervals. The tuberculin skin test is the only method currently available that demonstrates infection with *Mycobacterium tuberculosis* (*M. tuberculosis*) in the absence of active tuberculosis.

Note 2: If possible, the rear windows of a vehicle transporting patients with confirmed, suspected, or active tuberculosis should be kept open, and the heater or air conditioner set on a noncirculating cycle.

Additional References:

Chapter 296-62 WAC, Part J, Biological Agents-Bloodborne Pathogens.

WAC 296-62-08001(3), Exposure Control.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-02501, filed 5/10/96, effective 1/1/97.]

WAC 296-305-03001 Hazardous materials protection. (1) Structural fire fighting protective clothing shall not be used as primary protection for hazardous material incidents except as noted in the current edition of the Department of Transportation Emergency Response guidebook, which is incorporated by reference or shall be demonstrated by the employer to be equally effective.

(2) Fire departments shall use the technical data package provided by the clothing manufacturer when selecting the hazardous chemical protection.

(a) The approach to selecting personal protective clothing must encompass an ensemble of clothing items that are integrated to provide a level of protection and the ability to carry out emergency response activities.

(b) The following is a check list of components that may form the chemical protective ensemble:

- (i) Protective clothing (suits, coveralls, hoods, gloves, boots)
- (ii) Respiratory equipment (SCBA)
- (iii) Cooling system (ice vest, air circulation, water circulation)
- (iv) Head protection
- (v) Inner garments
- (vi) Outer protection (overgloves, overboots, flashcovers)

(3) Hazardous chemical protective equipment shall be classified by performance and for the purpose of this chapter are defined as:

- (a) Vapor-Protective Suits (Level "A")
- (b) Liquid Splash-Protective Suits (Level "B")
- (c) Support Function Protective Suits

(4) Fire department personnel involved in hazardous materials incident shall be protected against potential chemical hazards. Chemical protective clothing shall be selected and used to protect the respiratory system, skin, eyes, face, hands, feet, head, and body.

(5) Vapor protective and liquid splash-protective suits shall completely cover both the wearer and the wearer's breathing apparatus. Wearing a SCBA or other respiratory equipment outside the suit subjects this equipment to the chemically contaminated environment, increasing possible failure potentials and decontamination problems.

(6) Fire fighters who engage in operations likely to result in significant exposure to vapors that can reasonably be presumed harmful by way of dermal exposure shall have available and make appropriate use of vapor protective suits. Vapor protective suits shall meet the requirements of NFPA, Standard on Vapor Suits for Hazardous Chemical Emergencies in 1991, 1990 edition, with the single exception that suits meeting all but the flammability standard may only be worn in atmospheres verified by means of appropriate air monitoring to be at no more than 10% of the lower explosive limit (LEL).

(7) Prior to the use of vapor protective suits, liquid splash-protective suits or support function protective suits, the department shall consult the technical data package to assure that the garment is appropriate for the specific hazardous chemical emergency.

(8) Vapor protective suits and liquid splash-protective suits shall not be used alone for any fire fighting applications or for protection from radiological, biological, or cryogenic agents or in flammable or explosive atmospheres.

(9) Fire fighters who engage in operations or who are exposed to known chemicals in liquid-splash chemical environments during hazardous chemical material emergencies shall be provided with, and shall use, liquid splash-protective suits. Liquid splash-protective suits shall meet the requirements of NFPA, Standard on Liquid-Splash Protective Suits for Hazardous Chemical Emergencies 1992, 1991 edition.

(10) Liquid splash-protective suits shall not be used when operations are likely to result in significant exposure to chemicals or specific chemical mixtures with known or suspected carcinogenicity as indicated by any one of the following documents if it can reasonably be expected that

fire fighters in vapor protective suits would be significantly better protected:

(a) N. Irving Sax, *Dangerous Properties of Industrial Chemicals*, current edition.

(b) NIOSH Pocket Guide to Chemical Hazards, current edition.

(c) U.S. Coast Guard Chemical Hazard Response Information System (CHRIS), Volumes 13, Hazardous Chemical Data.

(11) Liquid splash-protective suits shall not be used when operations are likely to result in significant exposure to chemicals or specific chemical mixtures with skin toxicity notations as indicated by the American Conference of Government Industrial Hygienists (ACGIH), *Threshold Limit Values and Biological Exposure Indices for 1988-1989* if it can reasonably be expected that fire fighters in vapor protective suits would be significantly better protected.

(12) Support garments shall not be used in the hot zone of any hazardous material operation.

(13) Fire fighters assigned to functional support operations outside the hot zone during hazardous chemical emergencies shall be provided with and shall use support function protective garments. Support function garments shall meet the requirements of NFPA, *Standard on Support Function Protective Garments for Hazardous Chemical Operations 1993, 1990 edition*.

(14) Support function protective garments shall not be used for protection from chemical or specific chemical mixture with known or suspected carcinogenicity as indicated by (10)(a), (b), or (c).

(15) Support function protective garments shall not be used for protection from chemicals or specific chemical mixtures with skin toxicity notations as indicated in the American Conference of Governmental Industrial Hygienists, *Threshold Values and Biological Exposure Indices for 1988-1989*.

Note: Decontamination - See Appendix C.

Additional References: WAC 296-305-05011, Hazardous materials operations.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-03001, filed 5/10/96, effective 1/1/97.]

WAC 296-305-04001 Respiratory equipment protection. (1) Fire fighter's self-contained breathing apparatus (SCBA) shall:

- (a) Be pressure demand type (positive pressure);
- (b) Operate in the positive pressure mode only;
- (c) Have a minimum of thirty minutes service duration;
- (d) Be NIOSH certified; and
- (e) Meet the requirements of NFPA, *Standard on Open Circuit Self Contained Breathing Apparatus for Fire Fighters 1981, 1992 edition*.

(2) Closed circuit SCBA shall:

- (a) Be positive pressure;
- (b) Be NIOSH certified; and
- (c) Have a minimum thirty-minute service duration.

(3) Members using SCBA's shall operate in teams of two or more.

(4) Except as otherwise provided in this chapter, fire departments shall adopt and maintain a written respiratory

protection program that addresses the requirements of chapter 296-62 WAC, Part E, Respiratory protection and Part I-1, Asbestos, Tremolite, Anthophyllite, and Actinolite. This includes program administration, medical limitations, equipment limitations, equipment selection, inspection, use, maintenance, training, fit testing procedures, air quality, and program evaluation.

Note: Additional information on respirators and respirator usage can be found in ANSI Z88.2 - American National Standard for Respiratory Protection; ANSI Z88.5 - Practices for Respiratory Protection for Fire Service; various NFPA publications (1981, 1404, 1500, etc.), and the Washington State Fire Service Training Program for respiratory training and usage.

(5) When fire departments purchase compressed breathing air from a vendor, the fire department shall require the vendor to provide certification and documentation of breathing air quality quarterly as specified in subsection (22) of this section.

(6) When the fire department makes its own breathing air or uses vendor purchased breathing air, the air quality from compressors, cascade systems cylinders, shall be tested at least quarterly as specified in subsection (22) of this section.

(7) Qualitative or quantitative fit testing shall be conducted.

(a) Each new member shall be tested before being permitted to use SCBA's in a hazardous atmosphere.

(b) Only fire fighters with a properly fitting facepiece shall be permitted by the fire department to function in a hazardous atmosphere with SCBA. (Reference WAC 296-62-07115(3) Respiratory Sealing Problems.)

(c) Fit testing shall be repeated:

(i) At least once every twelve months.

(ii) Whenever there are changes in the type of SCBA or facepiece used.

(iii) Whenever there are significant physical changes in the user. Example: Weight change of ten percent or more, scarring of face seal area, dental changes, cosmetic surgery, or any other condition that may affect the fit of the facepiece seal.

(d) The fit testing is done only in a negative-pressure mode. If the facepiece is modified for fit testing, the modification shall not affect the normal fit of the device. Such modified devices shall only be used for fit testing.

(e) The fit test procedures and test exercises described in WAC 296-62-07739, Asbestos, Appendix C, shall be followed unless stated otherwise in this chapter.

(f) Respirator fit test records shall include:

(i) Written guidelines for the respirator fit testing program including pass/fail criteria;

(ii) Type of respirator tested including manufacturer, model, and size;

(iii) Type of fit test and instrumentation or equipment used;

(iv) Name or identification of test operator;

(v) Name of person tested;

(vi) Date of test; and

(vii) Results of test.

Note: Fire fighters should be issued individual facepieces.

(8) Facial hair, contact lenses, and eye and face protective devices.

(a) A negative pressure respirator, any self-contained breathing apparatus, or any respirator which is used in an atmosphere immediately dangerous to life or health (IDLH) equipped with a facepiece shall not be worn if facial hair comes between the sealing periphery of the facepiece and the face or if facial hair interferes with the valve function.

(b) The wearer of a respirator shall not be allowed to wear contact lenses if the risk of eye damage is increased by their use.

(c) If a spectacle, goggle, or face shield must be worn with a facepiece, it shall be worn so as to not adversely affect the seal of the facepiece to the face. See WAC 296-62-07115(3).

(d) Straps or temple bars shall not pass between the seal or surface of the respirator and the user's face.

(9) At the end of suppression activities (to include fire overhaul) and before returning to quarters:

(a) Fire fighters shall be decontaminated prior to removal of respirators whenever fire fighting activities resulted in exposure to a hazardous substance.

(b) When exchanging air supply bottles during suppression or overhaul activities, reasonable precautions shall be taken to maintain uncontaminated atmosphere to the breathing zone and facepiece supply hose.

(10) Self-contained respiratory equipment shall be available and used by all fire fighters who enter into hazardous atmospheres.

(a) Positive pressure air line respirators may be used only for atmospheres other than IDLH and must be equipped with a five minute minimum capacity positive pressure escape bottle.

(b) The self-contained air supply shall only be used for escape unless the service life of the air supply is greater than fifteen minutes.

(c) If the service life of the self-contained air supply is greater than fifteen minutes, it may be used to enter an IDLH atmosphere breathing from the self-contained air supply, provided that not more than twenty percent of the noted air supply is used during entry.

(11) The maximum length of hose for supplied air respirators is 300 feet (91 meters). Such hose shall be heavy duty nonkinking and NIOSH approved.

(12) Respirators shall be provided for, and shall be used by, all personnel working in areas where:

(a) The atmosphere is hazardous;

(b) The atmosphere is suspected of being hazardous; or

(c) The atmosphere may rapidly become hazardous;

(13) Anytime fire fighters are working inside a confined space, such persons shall be provided with SCBA or air line respirator with escape bottle, and shall use the equipment unless the safety of the atmosphere can be established by testing and continuous monitoring.

(14) Fire fighters using a properly functioning SCBA shall not compromise the protective integrity of the SCBA by removing the facepiece for any reason in hazardous atmospheres or in atmospheres where the quality of air is unknown.

(15) Fire fighters shall receive training for each type and manufacturer of respiratory equipment available for their use, the step-by-step procedure for donning the respirator and checking it for proper function. Required training shall include:

- (a) Recognizing hazards that may be encountered;
- (b) Understanding the components of the SCBA;
- (c) Understanding the safety features and limitations of the SCBA; and
- (d) Donning and doffing the SCBA.

(16) After completing such training, each fire fighter shall practice at least quarterly, for each type and manufacture of respirator available for use, the step-by-step procedure for donning the respirator and checking it for proper function.

(17) Members shall be tested at least annually on the knowledge of SCBA equipment operation, safety, organizational policies and procedures, and facepiece seals, to the fire department's standard. Such records shall remain part of the member training file.

(18) Members shall be allowed to use only the make, model, and size respirator for which they have passed a fit test within the last twelve months.

(19) In cases where there is a reported failure of an SCBA the unit shall be removed from service, tagged and recorded as such, and tested before being returned to service.

(20) Fire fighters shall be thoroughly trained in accordance with the manufacturer's instructions on emergency procedures such as use of regulator bypass valve, corrective action for facepiece and breathing tube damage, and breathing directly from the regulator (where applicable).

(21) Compressed gaseous breathing air in the SCBA cylinder shall meet the requirements of ANSI/CGA G7.1 - Commodity Specification for Air, with a minimum air quality of grade D, as well as meeting a water vapor level of 24 ppm or less.

(22) SCBA cylinders shall be hydrostatically tested within the periods specified by the manufacturer and the applicable governmental agencies.

Additional reference: Chapter 296-62 WAC, Part E.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-04001, filed 5/10/96, effective 1/1/97.]

WAC 296-305-04501 Automotive fire apparatus design and construction. (1) All new fire apparatus with the exception of specialized equipment, shall conform to the following minimum safety standards contained in NFPA Booklets No. 1901, 1902, 1903, 1904, and other 1900's.

(2) Fire apparatus, purchased after December 17, 1977, weighing 10,000 pounds or more shall conform with the following U.S. Department of Transportation standards, when applicable:

- (a) 571-121 Standard 121, Air brake systems;
- (b) 571-106 Standard 106, Hydraulic brake hoses;
- (c) 571-211 Standard 211, Wheel nuts, wheel discs, hub caps.

(3) Employers acquiring used apparatus or used equipment shall not be required to bring it under a more stringent code than the one in force at the time the apparatus was manufactured. However, such vehicle must meet applicable U.S. Department of Transportation standards and WAC 296-24-233.

(4) Fire apparatus tailboards and steps shall have a nonskid rough surface.

(5) Exhaust systems shall be installed and maintained in proper condition, and shall be so designed as to minimize the exposure of the fire fighter to the exhaust gases and fumes.

(6) Spinner knobs shall not be attached to the steering handwheel of fire apparatus.

(7) The transmission shifting pattern of the apparatus shall be clearly stenciled or labeled and posted so it can be clearly read by the driver while operating the apparatus.

(8) The height of any apparatus, over seven feet in height from the ground to the top of the beacon or highest point of the apparatus, shall be clearly labeled in a place where it can be easily and clearly read by the driver while operating the apparatus.

(9) All apparatus in excess of 10,000 pounds loaded weight, shall have the weight of the vehicle in pounds and tons clearly labeled in a place where it can be easily and clearly read by the driver while operating the apparatus.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-04501, filed 5/10/96, effective 1/1/97.]

WAC 296-305-04503 Automotive fire apparatus equipment. (1) Vehicles used to transport fire fighters and employer representatives shall have compartments for carrying sharp tools, saws, chisels, axes, etc., or if carried on the outside of the apparatus, equipment with sharp points and edges shall be covered to prevent injury to fire fighters and employer representatives.

(2) Personnel restraints for traveling.

(a) All persons riding on fire apparatus shall be seated and secured to the vehicle by seatbelts or safety harnesses at any time the vehicle is in motion.

(b) Seatbelts shall comply with U.S. Department of Transportation Part 49 CFR Section 571, Standards 209 and 210.

(c) Riding on tailsteps or in any other exposed position such as sidesteps or running boards shall be specifically prohibited.

(d) Standing while riding shall be specifically prohibited.

Note: See WAC 296-305-07011(3) for exceptions for wildland vehicles.

(3) Each fire apparatus shall carry a current U.S. Department of Transportation chemical identification book or the equivalent.

(4) Ladders stowed on the sides of apparatus, which protrude past the tailboard, shall have guards over the protruding ends.

(5) No employer shall permit automotive fire apparatus equipment which has an obstructed view to the rear, to be used in reverse gear unless the equipment has in operation a reverse signal alarm distinguishable from the surrounding noise level.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-04503, filed 5/10/96, effective 1/1/97.]

WAC 296-305-04505 Automotive apparatus operational rules. (1) Each employer of staffed fire apparatus shall establish a written policy and procedure whereby the apparatus has a scheduled daily operational check. Each

employer of unstaffed fire apparatus shall establish a schedule appropriate to that department's activities.

(2) Any item found to be in need of repair shall be reported immediately to the officer in charge or other appropriate person.

(3) Fire fighting apparatus shall be brought to a full stop before employees are allowed to step from the apparatus.

(4) Fire fighters shall not be in the apparatus hose bed while hose is being run out from the bed.

(5) Headlights shall be on at all times when any fire or emergency vehicle is responding to a call.

(6) All apparatus over 20,000 pounds (gross vehicle weight) shall utilize wheel blocks when parked at an emergency scene.

(7) Apparatus responding to alarms shall meet specifications in RCW 46.61.035, relating to operations of authorized emergency vehicles.

(8) All operators of emergency vehicles shall be trained in the operations of apparatus before they are designated as drivers of such apparatus. The training program shall be established by each fire department. Once trained, all operators shall familiarize themselves with any apparatus prior to operating such apparatus even for brief periods of time.

Additional Reference: Washington State Fire Protection Bureau - Emergency Vehicle Accident Prevention (EVAP) program.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-04505, filed 5/10/96, effective 1/1/97.]

WAC 296-305-04507 Fire apparatus maintenance and repair. (1) If at any time a fire apparatus is found to be in an unsafe condition, it shall be reported immediately to the officer on duty.

(2) If in the officer's determination, the apparatus cannot be used in a safe manner, it shall be taken out of service until it has been restored to a safe operating condition.

(3) All repairs and preventive maintenance to fire apparatus shall only be made by personnel deemed qualified by the registered owners of the fire apparatus.

(a) A preventive maintenance program shall be instituted and records maintained for each individual apparatus in order to record and track potential or on-going problems.

(b) A minimum annual service test of apparatus shall be made according to NFPA guidelines relating to pumper apparatus.

(c) Failure of any portion of the annual service test shall constitute the apparatus to be placed out of service as a pumper until adequate repairs are made and the apparatus successfully completes said tests.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-04507, filed 5/10/96, effective 1/1/97.]

WAC 296-305-04509 Aerial ladders. (1) When operating aerial ladders, the manufacturer's suggested procedures shall be followed.

(2) Aerial ladders shall be used according to the following requirements:

(a) The number of fire fighters permitted on aerial ladders shall be in accordance with the manufacturer's instructions.

(b) Aerial ladders shall not knowingly be positioned under dangerous cornices or other loose overhanging objects that may endanger fire fighters and fire fighters working on, or climbing the ladders, except where rescue operations are essential.

(c) When working on, or near energized electrical lines, the following minimum working clearances shall be observed:

(i) For lines rated 50 kv or below, the minimum clearance between the lines and any part of the equipment shall be ten feet.

(ii) For lines rated over 50 kv, the minimum clearance shall be ten feet plus 0.4 inch for each 1 kv.

(iii) For low voltage lines (operating at 750 volts or less), the work shall be performed in a manner to prevent the fire fighters contacting the energized conductor.

(d) Fire apparatus aerial ladders shall be positioned for the greatest stability feasible at the fire scene.

(e) The tip of the aerial ladder shall not be forcefully extended against a solid structure.

(f) Aerial ladders shall not be extended or retracted while fire fighters are climbing the ladder.

(g) Locking in shall not be permitted. If it is necessary for fire fighters to be positioned on the aerial, they shall be secured by a life belt.

(h) Ladder pipes, when in use, shall be secured to the aerial in such a manner so that the ladder pipe cannot accidentally be dislodged while in operation.

(i) The operator of an aerial ladder shall remain on the turntable whenever fire fighters are working on the aerial. If the ladder is used only as a ground ladder, no operator is needed on the turntable.

(3) The following shall regulate the design and use of the operating turntable and ladder:

(a) Ladders shall be designed to have nonskid protection on the rungs.

(b) Turntable controls and valves for rotating, extending, or elevating the aerial ladder shall be clearly and distinctly marked as to function.

(c) Aerial controls shall be spring loaded and have a safety catch so that the controls shall return to the neutral position if the operator is incapacitated.

(d) The operator of the aerial shall be provided with a nonskid surface on the turntable surface.

(e) A railing of approximately 44 inches in height, and if possible, not less than 36 inches in length, shall be installed on the turntable in back of the operators position.

(f) A light of not less than 10,000 candlepower shall be provided at the base to illuminate the ladder at night in any position of operation.

(4) The following shall regulate the communication systems on the aerial ladder and on the automotive fire apparatus.

(a) A two-way voice communication system shall be installed between the top fly of the ladder and the lower control station.

(b) There shall be some type of electrical signal or voice communication located in the tractor of tillered aerial for communication signals between the tillerman and driver.

The apparatus shall not be moved unless the proper signal, as shown in Appendix E, is received from the tillerman.

(5) When maintaining the aerial ladder, the manufacturer's instructions shall be followed.

(a) Cables, pulleys, rails and rungs of aerial ladders shall be inspected for wear and tightness on a monthly basis or every ten hours of operating time, whichever comes first.

(b) Pulleys on the aerial with cracks or pieces broken out of rims shall be replaced.

(c) Cables showing evidence of damage or wear shall be replaced.

(d) Rungs or rails that have been subjected to unusual impact shall be tested before usage.

(6) The automotive fire apparatus used in conjunction with aerial ladders shall be designed and used according to the following:

(a) Ground jacks or outriggers shall be deployed before an aerial ladder is put into operation.

(b) Ground plates shall be deployed under the outriggers or jacks at all times.

(c) Hand, airbrakes, and spring brakes for fifth wheel shall be set whenever an aerial ladder is in operation.

(d) In addition to ground jack supports and outriggers, wheel blocks shall be used whenever the aerial is in operation.

(e) Wheel chocks shall be rated by the manufacturer of the chock for the apparatus it is to be used on.

(f) Sand shall be put under jacks and outriggers when operating on ice or snow.

(7) Annual testing of metal aerial ladders shall follow the recommendations of the current National Fire Protection Association Standard.

(a) The aerial ladder, as well as the support section of the apparatus which supports the turntable, shall be nondestructively tested by a certified testing agency every five years.

(b) After any accident that causes structural damage, the test in (a) shall be performed and all defects detected shall be corrected before the apparatus is returned to service.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-04509, filed 5/10/96, effective 1/1/97.]

WAC 296-305-04511 Elevated platforms. (1)

Elevated platform system design requirements:

(a) The platform shall have a minimum floor area of fourteen square feet.

(b) The platform shall be provided with a guard railing. The guard railing shall be 42 to 45 inches high on all sides.

(c) The railing shall be constructed so that there is no opening below it greater than 19 inches.

(d) There shall be two gates below the top railing, each of which shall be provided with suitable safety latches.

(e) A kick plate not less than four inches high shall be provided around the floor of the platform.

(f) Drain openings shall be provided to prevent water accumulation on the platform.

(g) A heat-protective shield shall be provided on the platform for the protection of the operator.

(h) Hydraulic or pneumatic systems shall have a minimum bursting strength of at least four times the operating pressure for which the system is designed.

(i) The basic structural elements of the hydraulic or articulating boom shall have a safety factor of three.

(j) Each hydraulic or pneumatic system for the boom shall be equipped with a pilot operated check valve or other appropriate device to prevent free fall in the event of hydraulic failure.

(2) Requirements related to the controlling of elevated platforms:

(a) A control or device shall be provided at both the lower control station and the platform control station to allow either operator to completely deactivate the platform controls.

(b) During the deactivation of the platform controls, the lower controls shall remain operable.

(c) A plate shall be located at the platform control unit or units listing the following information:

(i) Model and serial number of the manufacturer;

(ii) Rated capacity of the platform;

(iii) Operating pressure of the hydraulic or pneumatic systems or both;

(iv) Caution or restriction of operation or both; and

(v) Control instructions.

(vi) This plate shall be clearly visible to the operator at the lower control position.

(d) There shall be an operator at the lower controls at all times while the fire fighter is in the bucket.

(e) The operator at the lower controls shall make certain the fire fighter on the platform is secured by his life belt, or equivalent, before raising the platform.

(3) Testing of elevated platforms and related apparatus shall be conducted annually.

(a) Testing of elevated platforms and related apparatus shall be in accordance with NFPA, Standard for Testing Fire Department Aerial Ladders 1914, 1991 edition.

(b) It is recommended that the boom section as well as the support section of the apparatus which supports the turntable should be nondestructively tested by a certified testing agency every five years.

(c) After any accident that causes structural damage, testing shall be performed and all defects detected shall be corrected before the apparatus is returned to service.

(d) Elevated platform testing shall follow recommendations of the current National Fire Code.

(e) Fire apparatus elevated platforms shall be positioned for the greatest stability feasible at the fire scene.

(4) A two-way voice communication system shall be installed between the platform and the lower control station.

(5) Automotive apparatus used in conjunction with elevated platforms shall be used in accordance with the following:

(a) Hand or air brakes shall be set before the platform is operated.

(b) Jacks or outriggers shall be used if the platform is to be elevated.

(c) Wheel blocks shall also be used when the platform is in operation unless the type of apparatus is one that has wheels that lift off the ground when the jacks or outriggers are engaged.

(d) Ground plates shall be used under the outriggers or jacks.

(e) Sand shall be put under jacks and outriggers when operating on ice or snow.

(f) When working on or near energized electrical lines, the fire department shall develop operational procedures for observing the following minimum working clearances:

(i) For lines rated 50 kv or below, the minimum clearance shall be ten feet.

(ii) For lines rated over 50 kv, the minimum clearance shall be ten feet plus 0.4 inch for each 1 kv.

(iii) For low voltage lines (operating at 750 volts or less), the work shall be performed in a manner to prevent the fire fighters contacting the energized conductor.

(6) Appliances mounted on elevated platforms. Platform mounted monitors shall be operated in accordance with the manufacturer's instructions.

Additional References: WAC 296-24-885.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-04511, filed 5/10/96, effective 1/1/97.]

WAC 296-305-05001 Emergency fireground operations—Structural. (1) The fire department shall establish an incident command system (ICS) with written guidelines applying to all members involved in emergency operations. All members involved in emergency operations shall be familiar with the ICS system. Personnel shall be trained and qualified by their department in the incident command system prior to taking a supervisory role at an emergency scene.

(2) At an emergency incident, the incident commander shall be responsible for the overall safety of all members and all activities occurring at the scene.

(3) All emergency incidents shall be managed by an ICS, the incident commander shall establish an organization with sufficient supervisory personnel to control the position and function of all members operating at the scene and to ensure that safety requirements are satisfied.

(4) At an emergency incident, the incident commander shall have the responsibility to:

(a) Assume and confirm command and take an effective command position.

(b) Perform situation evaluation that includes risk assessment.

(c) Initiate, maintain, and control incident communication.

(d) Develop an overall strategy and attack plan and assign units to operations.

(e) Develop an effective incident organization by managing resources, maintaining an effective span of control, and maintaining direct supervision over the entire incident by creating geographical and/or functional areas as appropriate for the scope and size of the incident.

(f) Review, evaluate, and revise the operational plan as required.

(g) Continue, transfer, and terminate command.

(5) The fire department shall develop a risk management policy that can be implemented into the function of incident command and the development of incident strategies.

The risk management policy should include direction and guidance to the incident commander in formulating incident planning relating to the level of risk that may be undertaken in any given incident to save lives and to save property in as safe a manner as dictated by the situation.

(6) The fire department shall establish written procedures and guidelines for tracking all members operating at an emergency incident.

(7) The incident command system shall provide for control of access to hazardous areas of the incident scene by department members.

(8) Fire fighters operating in hazardous areas at emergency structural fire incidents shall operate in teams of two or more.

Team members operating in hazardous areas shall be in communication with each other through visual, audible, physical, safety guide rope, or electronic means, or by other means in order to coordinate their activities. Team members shall be in close proximity to each other to provide assistance in case of emergency.

(9) The fire department shall provide personnel for the rescue of members operating at emergency incidents as the need arises.

(10) In the "initial stage" of a structure fire-incident where only one team is operating in the hazardous area, at least one additional fire fighter shall be assigned to stand by outside of the hazardous area where the team is operating.

(a) The responsibility of the standby fire fighter shall be the maintaining awareness of the status of fire fighters in the hazardous area.

(b) The standby fire fighter shall remain in positive communication with the entry team, in full protective clothing with SCBA donned, in the standby mode.

(c) The standby fire fighter shall be permitted to perform other duties outside the hazardous area, provided constant communications is maintained with the team in the hazardous area.

(11) Once additional crews are on the scene and assigned, the incident shall no longer be considered in the initial stage. At this point, the incident commander shall evaluate the situation and risks to operating crews. First and primary consideration shall be given to providing a rapid intervention team(s) commensurately with the needs of the situation.

(a) A rapid intervention team shall consist of at least two members and shall be available for the rescue of a member or a crew if the need arises.

(b) A rapid intervention team(s) shall be fully equipped with the appropriate protective clothing, protective equipment, SCBA, and specialized rescue equipment needed, based on the specifics of the operation underway.

(c) The composition and structure of rapid intervention teams shall be flexible based on the type of incident, the size and complexity of the operation.

(12) The fire department shall develop and maintain written guidelines for the safety of members at incidents that involve violence, unrest, or civil disturbance. Such situations may include but not be limited to riots, fights, violent crimes, drug related situations, family disturbances, deranged individuals, and people interfering with fire department operations.

(13) Officers at emergency scenes shall maintain an awareness of the physical condition of members operating within their span of control and ensure that adequate steps are taken to provide for their safety and health. The command structure shall be utilized to request relief and reassignment of fatigued crews.

(14) Wildfire suppression personal protective clothing/equipment shall not be utilized for interior attacks on structures.

(15) Teams in the hazardous area shall have positive communication capabilities with the incident command structure. Incident radio communication capabilities within the incident command structure shall include monitoring of incident-assigned frequencies (including mutual aid radio frequencies).

(16) Prior to overhaul, buildings shall be surveyed for possible safety and health hazards. Fire fighters shall be informed of hazards observed during the survey.

(17) During the overhaul phase officers shall identify materials likely to contain asbestos, limiting the breaching of structural materials to that which is necessary to prevent rekindle.

(18) Floatation devices shall be made available to fire fighters at incidents where drowning is a possibility. This is not intended to include pools and hot tubs.

(19) Fire fighters shall not cut the electrical drip loop providing power to the structure nor pull the electrical meter.

(20) Traffic cones or other traffic control devices shall be utilized when vehicular traffic hazards exist at an emergency operation.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-05001, filed 5/10/96, effective 1/1/97.]

WAC 296-305-05003 Confined space rescue operations. (1) Fire departments shall comply with chapter 296-62 WAC, Part M for their own confined spaces.

(2) Fire departments which have been contracted as an outside rescue service provider shall also comply with Part M and in particular the specific provisions of WAC 296-62-14519(1) which requires authorized entrant training and rescue practices from the host's actual permit spaces or representative permit spaces.

(3) Fire departments which have responded or will respond to calls to perform rescue from a noncontracted permit-required confined space are required to have each member of a rescue team practice making permit space rescues at least every 12 months by means of simulated rescue operations in which they remove dummies, mannequins or actual persons from permit space. A permit is required for the practice permit space entry.

(4) During an actual rescue response, written and/or verbally recorded hazard sizeup will be allowed in lieu of the written permit requirements in WAC 296-62-14507 and 296-62-14509 and shall be completed prior to any entry. This sizeup shall include at a minimum:

(a) Recognition and declaration of the situation as a confined space incident.

(b) Denial of entry to unprotected persons.

(c) Assessment of all readily available confined space documentation, e.g., MSDSs, any existing permit, plans or blueprints of the space.

(d) Assessment of number of victim(s), locations and injury conditions.

(e) Discussion with witnesses, supervisor, etc.

(f) Assessment of any current or potential space hazards, in particular, any hazard(s) which lead to the necessary rescue.

(g) Determination and declaration if body recovery or victim rescue.

(5) At confined space incidents, at least two people outside shall be equipped with appropriate breathing apparatus to act as the back-up team, which shall remain free of the contaminated area in order to rescue disabled fire fighters.

(6) Written documentation of the rescue team's training on the fire department's confined space operating procedures, authorized entrant training, if applicable, the contracted host's confined space program. A record of each of the hazard sizeups shall be maintained for at least one year.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-05003, filed 5/10/96, effective 1/1/97.]

WAC 296-305-05005 Rope rescue operations. (1) Fire departments engaged in rope rescue operations shall comply with the requirements of this section and WAC 296-305-02019.

(2) Employees engaged in rope rescue operations shall be properly trained and qualified by the employer to perform such activities.

(3) Employers shall establish standard operational procedures for rope rescue activities and training.

(4) When engaged in rope activities, employees shall be provided and wear either structural fire fighting helmets and gloves, or helmets that meet ANSI Standard Z89.1, 1986 edition, Class A and B; gloves.

(5) Records shall be maintained of inspections and repairs made to rope rescue equipment.

(a) Equipment shall be inspected after purchase and prior to placing in service, after each use, and at least semi-annually.

(b) Harnesses shall be inspected for worn or broken stitching, rivets worn out of holes, and damage from abrasion, cuts, or chemicals.

(c) Descending/ascending hardware shall be inspected for wear, cracks, distortion, sharp edges, and ease of operation.

(d) Equipment showing damage or wear that can affect employee safety, shall be either repaired prior to further use or retired.

(6) The manufacturer's recommended shelf life of rescue ropes shall be followed. If no shelf life is specified, ropes greater than six years old, whether used or not, shall be taken out of service or destroyed.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-05005, filed 5/10/96, effective 1/1/97.]

WAC 296-305-05007 Trench rescue operations. (1) Fire departments that engage in trench rescue operations shall adopt and maintain a written response program that addresses training and procedures to follow in emergency life threatening situations.

(2) Employees that directly engage in trench rescue operations shall be properly trained or shall be under the direct supervision of person(s) properly trained in operational procedures according to a Washington state accredited sixteen-hour emergency course or its equivalent.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-05007, filed 5/10/96, effective 1/1/97.]

WAC 296-305-05009 Watercraft rescue operations.

(1) If a manufacturer's specifications are such that an engineer is required for the operation of a vessel, then one shall be provided.

(2) When fire boats perform rescue activities they shall have two dedicated personnel. Any member not specifically required to operate the vessel, e.g., an operator (pilot) or engineer (if required by the manufacturers specification) may be used as a deck hand. This may include the boat officer if his/her duties do not include operating the fire boat.

(3) Watercraft load capabilities shall not exceed the manufacturer's specifications.

(4) Each fire department shall determine the function of their watercraft; as fire fighting, rescue, or both.

(5) Watercraft operating within navigable waters of the state of Washington (as defined by the United States Coast Guard) shall comply with all of the rules of the United States Coast Guard.

(6) Fire boats operating within navigable waters of the state of Washington (as defined by the United States Coast Guard) shall have a fully dedicated pilot.

(7) The operator (pilot) of the watercraft is responsible for its safe operation.

(8) Training for all personnel shall represent the intent of the employer and physical characteristics of the vessel involved and shall be included in the employer's accident prevention program.

(a) All assigned personnel shall be trained in safe operation of watercraft and the operations the craft is intended to perform.

(b) All employees involved in water rescue shall be trained in water rescue techniques and wear Coast Guard approved personal flotation devices, Type 2, minimum.

Exception: Employees working below deck or in enclosed cabins.

(9) All employers operating watercraft in nonnavigable waters shall be responsible for training all employees to local hazards.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-05009, filed 5/10/96, effective 1/1/97.]

WAC 296-305-05011 Hazardous materials operations. Fire departments engaged in emergency response to releases of hazardous substances shall comply with chapter 296-62 WAC, Part P, Hazardous Waste Operations and Emergency Response.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-05011, filed 5/10/96, effective 1/1/97.]

WAC 296-305-05013 Aircraft rescue and fire fighting. Fire departments that engage in aircraft rescue and fire fighting operations shall review NFPA, Manual for Aircraft Rescue and Fire Fighting Operations 402M, 1991 edition.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-05013, filed 5/10/96, effective 1/1/97.]

WAC 296-305-05501 Fire training. (1) All members who engage in emergency operations shall be trained commensurate with their duties and responsibilities. Training shall be as frequent as necessary to ensure that members

can perform their assigned duties in a safe and competent manner but shall not be less than the frequencies specified in this standard. Minimum training shall be as specified in this part.

(2) Live structural-fire training: Prior to being permitted to participate in live structure-fire training evolutions, the student shall have received adequate training in safety, protective breathing apparatus, fire hose, nozzles and fire streams, ladders, and rescue as defined by the employer.

(a) Strict safety practices shall be applied to all structures selected for live fire training evolutions.

(b) In preparation for live training, an inspection of acquired buildings shall be made to determine that the floors, walls, stairs and other structure components are capable of withstanding the weight of contents, participants and accumulated water.

(c) Removal or neutralization of materials of all hazardous storage and conditions within the structure shall be accomplished.

(i) Closed containers and highly combustible materials shall be removed.

(ii) Oil tanks and similar closed vessels that cannot easily be removed shall be vented sufficiently to eliminate an explosion or overpressure rupture.

(iii) Any hazardous or combustible atmosphere within the tank or other vessel shall be rendered inert.

(iv) Hazards potentially dangerous to participants such as floor openings, missing stair tread and rails, and other such hazards shall be repaired or made inaccessible.

(d) If applicable, floors, railings and stairs shall be made safe. Special attention shall be given to potential chimney hazards.

(e) Debris hindering the access or egress of fire fighters shall be removed before continuing further operations.

(f) Buildings that cannot be made safe as required by this section shall not be utilized for interior live fire training.

Note: The water supply for any individual live fire training evolution should be assessed based on the extent of the evolution, size and structure of the building and contents to be involved, method of attack to be employed, protection of exposures and reserves for potential contingencies. Separate sources should be used for supply to attack and backup lines.

(g) Prior to conducting actual live fire training evolutions, a preburn briefing shall be conducted for all participants.

(i) All evolutions shall be discussed and assignments shall be made for all crews participating in the training sessions.

(ii) All participants shall have a knowledge and familiarity with the layout of the building.

(h) A safety officer shall be appointed for all live fire training evolutions.

(i) One person shall be designated to control the materials being burned and to ignite the training fire in the presence and under the direction of the safety officer. This person shall not be a student and shall wear full protective clothing, including SCBA.

(j) Unidentified materials such as debris which may burn in unanticipated ways, react violently, or create environmental hazards, shall not be used in live fire training evolutions.

(k) Each participant in a coordinated interior live fire training evolution shall be equipped with full protective clothing and SCBA. All participants shall be inspected by the safety officer to insure all protective clothing and SCBA are being properly worn prior to entry into a live fire training evolution.

(l) All instructors shall be deemed qualified to deliver structural fire fighting training by the employer. The instructor-student ratio shall not be greater than one to five.

(m) Officers shall make a head count both when entering and exiting a building during an actual attack.

(n) Supervisors at the training evolution shall maintain an awareness of the condition of members operating within the span of their control. They shall ensure adequate steps are taken to provide for the safety and health of the participants and relief or reassignment of fatigued persons.

(3) Fire fighters shall be trained in the function, donning and doffing, care, use, inspection, maintenance and limitations of the equipment assigned to them or available for their use.

(4) When fire fighters are engaged in training above the ten-foot level where use of life lines or similar activities are to be undertaken, a safety net shall be erected or other approved secondary means of fall protection such as recommended in chapter 296-155 WAC, Part C-1, Fall restraint and fall arrest, shall be used in lieu of nets.

(5) During wet training exercises, hose meeting the 250 pound annual hose test shall be used.

(6) Training shall be provided to fire fighters and officers in order that they will be knowledgeable in the identification and handling of asbestos containing materials likely to be encountered during a fire response.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-05501, filed 5/10/96, effective 1/1/97.]

WAC 296-305-05503 Summary of training requirements. (1) Training on hearing conservation shall conform to chapter 296-62 WAC, Part K, and WAC 296-305-02005.

(2) Training on medical procedures shall conform to WAC 296-305-02501.

(3) Training on respiratory equipment shall conform to chapter 296-62 WAC, Part E, Respiratory protection, and WAC 296-305-04001.

(4) Training on employee right-to-know procedures shall conform to chapter 296-62 WAC, Part C, Hazard communication.

(5) Training on overhaul procedures and operations shall conform to WAC 296-305-05001.

(6) Training on wildland fires shall conform to WAC 296-305-07001 through 296-305-07019.

(7) Training on confined space entry and/or rescue shall conform to chapter 296-62 WAC, Part M, Permit-required confined spaces and WAC 296-305-05003.

(8) Live fire training in structures shall conform to NFPA 1403 and this section.

(9) The employer shall provide training and education for all members commensurate with those duties and functions that members are expected to perform. Such training and education shall be provided to members before they perform emergency activities. Fire service leaders and training instructors shall be provided with training and

education which is more comprehensive than that provided to the general membership of the fire department.

(10) The employer shall assure that training and education is conducted frequently enough to assure that each member is able to perform the member's assigned duties and functions satisfactorily and in a safe manner so as not to endanger members or other employees. All members shall be provided with training at least annually. In addition, members who are expected to perform interior structural fire fighting shall be provided with an education session or training at least quarterly.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-05503, filed 5/10/96, effective 1/1/97.]

WAC 296-305-06001 Fire service equipment. (1) All portable equipment shall be inspected routinely to ensure that it is ready for use.

(2) Any defective equipment shall be removed from service.

(3) Nylon utility straps or straps of equivalent strength should be used instead of hose belts. The utility strap shall be of one-inch nylon, or equivalent belting, with a four-inch overlap and sewn with polyester thread and shall measure at least 102 inches on the outside circumference.

(4) The load capacity shall be stenciled on each portable jack and the load capacity shall not be exceeded.

(5) The instruction plate on portable jacks shall be maintained in a legible condition.

(6) Portable powered cut-off saws (rescue saws) shall be used in accordance with the manufacturer's recommendations.

Exception: The lower blade guard described in WAC 296-24-65501 (1)(a) is not required on hand-held portable powered cut-off saws used by fire/rescue personnel for rescue procedures and/or roof ventilation for smoke removal, provided the operator is wearing appropriate eye, face, head, and body protection as specified in WAC 296-305-02001 through 296-305-02013. This exception also applies to qualified persons (e.g., instructors) wearing personal protective equipment as described herein to instruct personnel in safe roof ventilation/rescue techniques.

(7) When not in use, the cutting teeth on a chain saw shall be covered either by an old section of hose, a wooden scabbard, or an equivalent method.

(8) All axes worn by employees shall be provided with a scabbard to guard against injury from the blade and pick of the axe.

(9) The guards on smoke ejectors, as supplied by the manufacturer, shall not be removed and the operator of the ejector shall wear gloves.

(10) Acetylene cylinders. Handling, storage and utilization of acetylene in cylinders shall be in accordance with the Compressed Gas Association Pamphlet G-1 - 1966 edition.

(11) Powder activated life-line guns and accessories shall be stored in a box or container equipped with a lid or cover.

(a) The box shall be kept closed when not in use.

(b) A loaded life-line gun shall not be placed in the storage box.

(c) Instruction books, cleaning kits and hand tools needed for maintenance or breakdown purposes shall be kept in the life-line gun storage box.

(d) The words "powder activated tool" shall be conspicuously printed on the top of the storage box.

(12) Abrasive blades in storage shall be protected from contact with water, liquids, petroleum products and their fumes.

(13) Fiber rope that has been subjected to injurious chemicals or excessive heat shall not be used for load carrying purposes.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-06001, filed 5/10/96, effective 1/1/97. Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-305-06001, filed 11/30/83; Order 77-20, § 296-305-06001, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-06003 Testing fire service equipment.

(1) When testing fire hose, a restricted orifice disc having not more than a 25% opening, shall be installed on the pumper discharge port. Or in the alternative, the pumper discharge valve may be opened not more than 25% to insure a minimum volume of water in case of a bursting hose.

(2) Safety nets shall be tested annually by dropping a weight of not less than 400 pounds from the highest point to be used above the net. The test weight object may consist of two tightly tied rolls of two and one-half inch hose, each 100 feet long, or any other object having similar weight and dimension.

(a) The net suspension system shall be designed and constructed with a safety factor of four and as a minimum, shall withstand the test loading without permitting contact between the net and any surface or object below the net.

(b) Forged steel safety hooks or shackles shall be used to fasten the net to its supports.

(c) Training requiring safety net protection shall not be undertaken until the net is in place and has been tested by the weight of three fire fighters on the net.

(d) Safety nets shall extend eight feet beyond the edge of the work surface.

(e) The mesh size of nets shall not exceed six inches by six inches.

(f) All nets shall meet accepted performance standards of 17,500 foot pounds minimum impact resistance as determined and certified by the manufacturer, and shall bear a label of proof test.

(g) Edge ropes shall provide a minimum breaking strength of 5,000 pounds.

(3) Life belts shall meet or exceed the strength requirements of ANSI A10.14 - Requirements for Safety Belts, Harnesses, Lanyards, Lifelines and Drop Lines for Industrial Use. Life belts shall be inspected after each use and not less than semi-annually in accordance with manufacturer's instructions.

(4) Rescue ropes shall be used for rescue purposes only.

(5) Rescue ropes shall meet the following requirements:

(a) Rescue ropes shall be constructed of rot-proof fiber with a melting point of not less than 400 degrees F;

(b) They shall be of abrasion resistant construction;

(c) They shall have a minimum breaking strength of not less than 9,000 pounds.

(6) Rescue ropes shall be inspected after each use and not less than semi-annually in accordance with manufacturer's instructions.

(7) The method of testing a life line gun shall be in accordance with the manufacturer's recommended procedure.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-06003, filed 5/10/96, effective 1/1/97. Statutory Authority: Chapter 49.17 RCW. 88-14-108 (Order 88-11), § 296-305-06003, filed 7/6/88. Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-305-06003, filed 11/30/83; Order 77-20, § 296-305-06003, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-06005 Ground ladders. This section establishes the minimum requirements for the construction, care and use of the common types of ladders used in fire combat.

(1) Ladder locks or pawls on extension ladders shall be so fastened or secured to the beams that vibration and use will not cause loosening of bolts and nuts.

(a) Pawls or ladder locks shall be so constructed that the hook portion of the pawl that engages the rung shall have sufficient bearing surface or area to prevent the hook from cutting into rungs when engaged.

(b) Such hooks shall be properly finished to eliminate sharp edges and points.

(2) Staypoles or tormenters shall be furnished on all extension ladders extending over forty feet. Staypole or tormenters spikes shall not project beyond the butt of the ladder when nested.

(3) All ladders shall be stored in a manner to provide ease of access for inspection, and to prevent danger of accident when withdrawing them for use.

(4) Fire fighters shall climb and descend ground ladders with the fly in, for safety purposes, when not in conflict with the manufacturer's recommendations. Even when ladders are routinely used in the fly out configuration, in adverse conditions fire fighters shall be permitted to climb and descend ground ladders with the fly in to assure secure footing.

(5) All ladders regardless of type shall be inspected thoroughly after each use. Records shall be kept of the inspections and repairs.

(6) The following metal ladder components shall be checked:

(a) Rungs for welds, damage or weakness caused by overloading or bumping against other objects, looseness and cracks, etc.

(b) Beams for welds, rivets and bolts, signs of strain or metal fatigue, and deformation from heat or overloading.

(c) Bolts and rivets for tightness.

(d) Butt spurs for excessive wear or other defects.

(e) Halyards for the same defects listed for wood ladder halyards and cable halyards, for fraying or breaking.

(f) Heat sensor label, when provided, for change indicating heat exposure.

(7) The following wood ladder components shall be checked:

(a) Bolts for snugness and tightness without crushing the wood.

(b) Beams for dark streaks; when a wood ground ladder develops dark streaks in the beams, the ladder shall be

removed from service and service tested as specified in this chapter, prior to further use.

(c) Protective varnish finish for damage or wear, at least once a month and redone annually or at such frequency as specified by the manufacturer. If the protective finish becomes charred or blistered, the ladder shall be removed from service and service tested as specified in this chapter, prior to further use.

(8) Methods of fastening ladder halyards, either of wire or fibrous material, shall be in a manner that the connection is stronger than the halyard.

(9) Any defect noted in above visual inspection shall be corrected prior to testing.

(10) Every portable ladder shall be tested following the correction of defects disclosed by the visual inspections.

(11) New ground ladders purchased after the effective date of this chapter shall be constructed and certified in accordance with the requirements of NFPA Standard 1931, 1994 edition.

(12) All fireground ladders shall be inspected and maintained in accordance with the requirements of NFPA Standard 1932, 1994 edition. When metal ground ladders are tested, they shall be tested in accordance with the requirements of NFPA Standard 1932, 1984 edition.

(a) Extension ladders that were constructed prior to the adoption of the 1984 edition of NFPA 1931, may, when tested in accordance with this chapter, be tested with a minimum test load of 400 pounds and a preload of 300 pounds. Ladders tested under this exception shall be used with a maximum load limit of 500 pound distributed or 400 pound concentrated. Ladders shall be tested in the configuration they are used.

(b) Additional requirements for wooden ground ladders; whenever any wood ground ladder has been exposed or is suspected of having been exposed to direct flame contact the ladder shall be service tested as specified in section 5-2 of NFPA Standard 1932, 1984 edition.

Note 1: Hardness testing and eddy current NDE testing is not required in the fire department annual maintenance inspection unless the individual ladder has been subjected to a high heat exposure which could have annealed the metal and diminished the structural integrity. The ladder manufacturer's recommendations should be followed with respect to hardness and eddy current testing.

Note 2: Testing should follow the recommended procedures taught by Washington State Fire Protection Bureau.

Additional references: Chapter 296-24 WAC, Part J-1.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-06005, filed 5/10/96, effective 1/1/97. Statutory Authority: Chapter 49.17 RCW. 88-14-108 (Order 88-11), § 296-305-06005, filed 7/6/88. Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-305-06005, filed 11/30/83; Order 77-20, § 296-305-06005, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-06007 Electrical. (1) Temporary lighting with the use of 110 - 120 VAC equipment.

(a) All lighting equipment shall be provided with heavy duty flexible cords with SO or SJ jackets or equivalent. All lighting equipment shall be used with heavy duty flexible extension cords with 12-3 conductors with SO or SJ jackets or equivalent.

(b) Electrical cords shall have weather tight bodies and caps, 20 amp rated at 120 VAC.

(c) Temporary lights that are used in moist, damp, and/or other hazardous locations shall be approved for the purpose.

(d) Temporary lights shall be constructed so that water cannot enter or accumulate in wireways, lampholders or other electrical parts.

(e) Temporary lights that are used in moist and/or other hazardous locations shall have 120 VAC single-phase 15 and/or 20 amp in-line resettable ground fault circuit interrupters.

(f) Temporary lights shall be equipped with a handle and be insulated from heat and possible electrical shock.

(g) Temporary lights shall not be suspended by their electrical cords unless cords and lights are designed and labeled for this means of suspension.

(h) Temporary lights shall be protected by guards of a nonconductive or insulated material to prevent accidental contact with the bulb.

(2) 120 VAC cord reels shall be approved for use in damp or hazardous locations.

(a) Bodies and caps shall be weather tight, 20 amp rated at 120 VAC.

(b) Cords on cord reels that do not exceed 150 feet in length shall be SO or SJ type jackets or equivalent.

(c) Cords that exceed 150 feet in length on reels, shall have 10-3 conductors.

(d) Cord reels that are not permanently mounted on a vehicle shall be insulated from the ground when in use.

(3) Twelve volt portable type hand lanterns shall be constructed of molded composition or other type approved for the purpose.

(a) Portable hand lanterns used in moist and/or other hazardous locations shall be operated at a maximum of 12 volts.

(b) Hand lamps shall be equipped with a handle and a substantial guard over the bulb and attached to the lamp-holder.

(4) Portable and vehicle-mounted generators.

(a) Portable generators. Under the following conditions, the frame of a portable generator shall not be required to be grounded and shall be permitted to serve as the grounding electrode for a system supplied by the generator:

(i) The generator supplies only equipment mounted on the generator or cord-connected and plug-connected equipment through receptacles mounted on the generator, or both, and

(ii) The noncurrent-carrying metal part of equipment and the equipment grounding conductor terminals of the receptacles are bonded to the generator frame.

(b) Vehicle-mounted generators. Under the following conditions, the frame of a vehicle may serve as the grounding electrode for a system supplied by a generator located on the vehicle:

(i) The frame of the generator is bonded to the vehicle frame; and

(ii) The generator supplies only equipment located on the vehicle and/or cord-connected and plug-connected equipment through receptacles mounted on the vehicle or on the generator; and

(iii) The noncurrent-carrying metal parts of equipment and the equipment grounding conductor terminals of the receptacles are bonded to the generator frame.

Additional references: Article 250 National Electrical Code. Chapter 296-24 WAC, Part L.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-06007, filed 5/10/96, effective 1/1/97. Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-305-06007, filed 11/30/83; Order 77-20, § 296-305-06007, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-06501 Requirements for fire station facilities. WAC 296-305-06501 through 296-305-06519 pertain to all fire department facilities as defined in WAC 296-305-01005.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-06501, filed 5/10/96, effective 1/1/97. Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-305-06501, filed 11/30/83; Order 77-20, § 296-305-06501, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-06503 General requirements. (1) Stations and administrative offices shall comply with the requirements of the general occupational health standards, WAC 296-62-09003, Lighting and illumination.

(2) Every new fire station built after the effective date of this chapter, whether manned or unmanned, shall be equipped with an approved emergency lighting system that will light dormitories, hallways, and apparatus bay areas in case of electrical power failure.

(3) No new fire station or new addition to an existing fire station, shall incorporate sliding poles or slides in their design or construction.

(4) The requirements of chapter 296-24 WAC, Part B-2, Window washing, shall be followed when employees are engaged in window washing operations.

(5) All new fire stations and other new fire department facilities which contain sleeping quarters shall be fully protected with automatic sprinkler systems.

(6) All existing fire stations and existing fire department facilities with sleeping quarters, that undergo a major renovation that consists of more than sixty percent of the assessed evaluation of the existing structure shall be fully protected with automatic sprinkler systems.

(7) Eye protection shall be worn when charging, changing or adding fluid to storage batteries. Personnel that will be charging storage batteries shall be qualified to perform this function by the employer. See WAC 296-24-23015.

(8) Stairway tread shall be of a nonskid design. Examples of nonskid: Grip strut grating, serrated edge grating, metal grating, aluminum safety tread, abrasive metal stair tread, or pressure sensitive nonskid type.

(9) In existing facilities where sliding poles or slides are used, the pole or slide hole shall be guarded in such a manner as to prevent anyone from walking directly into the pole or slide hole opening.

(10) To absorb the shock to sliding employees, the bottom of all slide poles or slides shall have a three-foot diameter cushioned rubber mat, or its equivalent.

(11) Nothing shall be stored or placed at the bottom of a pole or slide hole for a radius of three feet from the pole.

Doors shall not protrude within three feet of the pole or slide.

(12) Stair and landing protection: Stairways, guardrails, landings, and handrails shall be constructed to the requirements of chapter 19.27 RCW the State Building Code Act, and chapter 296-24 WAC, Part J-1.

(13) A standard guard railing for a landing platform shall include a toeboard, which is a vertical barrier, at floor level erected along exposed edges of a floor opening, wall opening, platform, runway or ramp to prevent falls of material.

(14) Any new facility, or addition, alteration, or repair to an existing facility shall be in compliance with chapter 19.27 RCW, the State Building Code Act.

(15) New stations containing a kitchen, and station kitchens remodeled after the date of this chapter, shall have an alarm activated service disconnect of fixed cooking appliances.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-06503, filed 5/10/96, effective 1/1/97. Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-305-06503, filed 11/30/83; Order 77-20, § 296-305-06503, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-06505 Sanitation, disinfection, cleaning, and storage areas. (1) Fire departments shall provide facilities for disinfecting, cleaning, and storage.

(2) A designated cleaning area shall be provided for under the fire department's exposure control plan for the cleaning and disinfecting of protective equipment, portable equipment, and other clothing.

(a) Fire departments that engage in emergency medical operations shall provide or have access to disinfecting facilities for the cleaning and disinfecting of emergency medical equipment.

(b) Disinfecting shall not be conducted in fire station kitchen, living, sleeping, or personal hygiene areas.

(c) Disinfecting facilities in fire stations shall be vented to the outside environment, and designed to prevent contamination of other fire station areas.

(d) The disinfecting facility shall contain a sink with hot and cold water faucets. All surfaces shall be nonporous surfaces.

(e) Handwashing facilities shall be readily accessible to members. Handwashing facility means a facility providing an adequate supply of running potable water, soap and single use towels or hot air drying machines. When provision of handwashing facilities is not feasible, the employer shall provide either an appropriate antiseptic hand cleaner in conjunction with clean cloth/paper towelettes or antiseptic towelettes.

(3) Protective clothing or equipment that needs to be decontaminated and/or disinfected shall not be allowed in any kitchen, living, sleeping, or personal hygiene area.

(4) The designated cleaning area shall be physically separate from areas used for food preparation, cleaning of food and cooking utensils, personal hygiene, sleeping, and living areas.

(5) Drying areas for protective clothing shall be well ventilated.

(6) Storage areas: Emergency medical supplies and equipment stored in fire stations, other than that stored on

vehicles, shall be stored in a dedicated enclosure and maintained per manufacturer's instructions.

(7) Reusable emergency medical supplies and equipment, protective clothing, and protective equipment shall not be stored in kitchen, living, sleeping, or personal hygiene areas, nor shall it be stored in personal clothing lockers.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-06505, filed 5/10/96, effective 1/1/97. Statutory Authority: Chapter 49.17 RCW. 88-14-108 (Order 88-11), § 296-305-06505, filed 7/6/88. Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-305-06505, filed 11/30/83; Order 77-20, § 296-305-06505, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-06507 Sleeping areas. (1) All sleeping areas in fire stations shall be separated from vehicle storage areas by at least one-hour fire resistive assemblies. Compliance with this section shall be required within three years of the effective date of this chapter.

(2) Sleeping areas shall be protected by smoke detectors.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-06507, filed 5/10/96, effective 1/1/97. Statutory Authority: Chapter 49.17 RCW. 88-14-108 (Order 88-11), § 296-305-06507, filed 7/6/88; Order 77-20, § 296-305-06507, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-06509 Apparatus areas. (1) Three feet of clearance shall be maintained around apparatus parked within the station where the station's width permits.

(2) All fire stations built after December 17, 1977, shall have a minimum of three feet of clearance around the apparatus, which shall be maintained free of any storage or obstruction.

(3) The station's apparatus floors shall be kept free of grease, oil, water and tripping hazards.

(4) Floors shall have slip-resistant surfaces on areas where personnel would normally mount or dismount apparatus.

(5) No Class I or Class II flammable liquids shall be used for cleaning purposes to remove grease or dirt from apparatus.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-06509, filed 5/10/96, effective 1/1/97. Statutory Authority: Chapter 49.17 RCW. 88-14-108 (Order 88-11), § 296-305-06509, filed 7/6/88. Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-305-06509, filed 11/30/83; Order 77-20, § 296-305-06509, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-06511 Indoor air quality. Air quality shall be consistent with WAC 296-62-075 through 296-62-07515, Air contaminants and WAC 296-62-12000 through 296-62-12009, Environmental tobacco smoke in office work environments.

Note: For extended work shifts all eight-hour PEL's shall be time-weighted to adjust for additional worker exposure during extended work shifts.

(1) If indoor air monitoring indicates over-exposure to contaminant PEL's, engineering controls shall be utilized to reduce fire fighter exposure to the lowest feasible level.

(2) All fixed internal combustion equipment such as, but not limited to emergency generators, shall be effectively exhausted to the exterior of the fire stations.

(3) All facilities dedicated to the maintenance and repair of internal combustion equipment shall have means for effective ventilation to the exterior of the building.

(4) All fire stations built after January 1, 1997, shall be designed and constructed to conform to ACGIH ventilation recommended criteria for exhaust of internal combustion engines.

Additional reference: Industrial Ventilation Manual of Recommended Practices ISBN No.: 0-936712-65-1.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-06511, filed 5/10/96, effective 1/1/97; Order 77-20, § 296-305-06511, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-06513 Refueling areas. (1) Refueling pumps, if installed, shall be in accordance with the provisions of the Uniform Fire Code and WAC 296-24-33015.

(2) Dispensing of Class 1 liquids shall be as required in the Uniform Fire Code.

(3) Spillage of oil or fuel shall be properly disposed of or completely evaporated and the fuel tank cap replaced before restarting engine.

(4) Fueling areas shall be posted - "NO SMOKING - STOP YOUR MOTOR."

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-06513, filed 5/10/96, effective 1/1/97; Order 77-20, § 296-305-06513, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-06515 Hose drying towers. (1) The floor openings on hose tower platforms shall be equipped with a forty-two inch guardrail with mid-rail and shall be capable of withstanding a force of 250 pounds applied in any direction at any point on the top rail. The work platform shall be equipped with toeboards.

(2) The requirements for offset ladder platforms and ladder cage guards, when ladders extend beyond twenty feet, shall apply to hose drying towers.

(3) Ropes and attachments used to hoist hose in the hose towers shall have a breaking strength of 1500 pounds for a safe load strength of 300 pounds (five-to-one safety factor).

(4) Approved head protection shall be worn by all persons in the hose tower whenever hose handling/hanging operations are taking place.

(5) Ropes utilizing a pulley block shall be appropriately sized for the sheave to prevent possible jamming or damage to the rope.

Additional reference: Chapter 296-24 WAC, Part J-1.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-06515, filed 5/10/96, effective 1/1/97; Order 77-20, § 296-305-06515, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-06517 Drill tower training facilities. (1) Permanent fixed ladders on the outside of drill towers and drill buildings are exempt from the requirements of offset platform landings and ladder cage guards.

(2) Drill tower construction and operations shall comply with the following:

(a) Burn buildings used for live fire training shall be engineered for such use.

(b) Drill towers shall not be used for live fire training except when burn rooms are provided.

(c) Burn rooms, if included in the building, shall be engineered into drill towers.

(d) All walking surfaces in the drill tower shall be slip resistant.

(e) Railings shall be designed with a four-to-one safety ratio for 250 pound fire fighters who may be operating a charged hose line on the fire escape.

(f) Rappelling anchors shall be engineered to support 4500 pounds per person supported by the anchor.

(g) Rappelling anchors shall be readily identifiable.

(h) Rappelling anchors shall be certified by a structural engineer.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-06517, filed 5/10/96, effective 1/1/97. Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-305-06517, filed 11/30/83; Order 77-20, § 296-305-06517, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-06519 Fire station equipment and tools. (1) Equipment and tools in maintenance shops shall be guarded as required by the guarding provisions of chapter 296-24 WAC, Part C, Machine guarding, and Part H-1, Hand and portable powered tools.

(2) Exposure of fan blades. When the periphery of the blades of a fan is less than ten feet above the floor or working level, the blades shall be guarded. The guard shall have openings no larger than one-half inch. This provision shall not apply to residential ceiling fans.

(3) Abrasive wheels and grinders.

(a) All abrasive wheels and grinders, shall be guarded as required by chapter 296-24 WAC, Part C.

(b) Goggles or face shields shall be used when grinding.

(c) Abrasive and composite blades shall be stored and protected against exposure to fuel and oil.

(d) Work rests on bench mounted abrasive wheel grinders shall be used to support the work. These shall be of rigid construction and designed to be adjustable to compensate for wheel wear. Work rests shall be kept adjusted sufficiently close to the wheel with a maximum opening of one-eighth inch to prevent the work from being jammed between the wheel and the rest. Adjustment of the work rest shall not be made while the wheel is turning.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-06519, filed 5/10/96, effective 1/1/97.]

WAC 296-305-07001 Wildland fire operations. (1) This section shall apply to all personnel and agencies called on to provide services at any fire defined as a "wildland fire."

(2) This section shall not apply to suppression action taken on fires prior to the fire meeting the definition of a "wildland fire."

(3) Employers shall provide at no cost to the employee, the protective equipment and protective clothing required by this chapter. Personnel performing suppression actions on a wildland fire shall wear the provided protective clothing as directed by their fire department's procedures/guidelines.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-07001, filed 5/10/96, effective 1/1/97. Statutory Authority: Chapter 49.17 RCW. 88-14-108 (Order 88-11), § 296-305-07001, filed

7/6/88. Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-305-07001, filed 11/30/83; Order 77-20, § 296-305-07001, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-07003 Personal protective clothing and equipment for wildland fire fighting. (1) Protective apparel and equipment for wildland fire fighters shall be designed to provide thermal protection for the fire fighters against external heat sources with flame resistant clothing and equipment without creating high heat stress loads due to the prolonged work periods they experience. Members performing suppression on a wildland fire shall wear a provided protective clothing ensemble as directed by their employer. The combined protective clothing ensemble includes:

(a) Hardhat/helmet

(b) Upper and lower torso clothing

(c) Gloves

(d) Goggles

NFPA Standard Protective Clothing and Equipment for Wildland Fire fighting 1977, 1993 edition shall serve as a guideline for determining performance characteristics of this clothing.

(2) As a minimum, members shall wear provided leather lace-up boots of sturdy construction which shall extend upward a minimum of 8 inches above the top of the sole, which shall be slip resistant.

(3) Additional personal protective equipment to be provided and worn shall include a fire shelter as directed by the incident commander.

(4) Wildland protective clothing shall comply with this standard within two years of the effective date of this chapter.

(5) Personnel operating Type 1 or Type 2 engines assigned to structural protection will carry structural protective clothing on their assigned apparatus.

(6) Wildland personnel protective clothing shall not be used for interior structural fire fighting.

(7) Persons provided fire shelters shall be trained in their use and shall receive refresher training at least annually.

(8) Personnel wearing full structural fire fighting clothing while engaged in fighting wildland fires shall not expend more than one hour before rotating to rest and rehabilitation. Agencies may rotate crews to avoid the one-hour benchmark when containing and controlling wildland fires.

(9) Fire departments shall establish written procedures for the care, use, maintenance, and retirement criteria for protective equipment in conjunction with the manufacturers' recommendations.

(10) Fire departments shall establish written procedures for the use of protective clothing and protective equipment while performing fire fighting activities.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-07003, filed 5/10/96, effective 1/1/97. Statutory Authority: Chapter 49.17 RCW. 88-14-108 (Order 88-11), § 296-305-07003, filed 7/6/88. Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-305-07003, filed 11/30/83; Order 77-20, § 296-305-07003, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-07005 Respiratory protection for wildland fire fighters.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060, 96-11-067, § 296-305-07005, filed 5/10/96, effective 1/1/97. Statutory Authority: RCW 49.17.040 and 49.17.050, 83-24-013 (Order 83-34), § 296-305-07005, filed 11/30/83; Order 77-20, § 296-305-07005, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-07007 Wildland personnel accountability. (1) Wildland fire fighters shall not be required to wear personal alerting devices except when wearing self contained respiratory equipment.

(2) An officer shall maintain positive communication with any individual during those times that the member is assigned an ancillary fire fighting task (examples would include, but are not limited to, scout, safety officer, or watch person).

(3) Wildland fire fighters shall work in teams of two or more while working on or near the fire line of an active fire unless they are in visual or voice contact with an officer.

(4) On initial attack fires, the incident commander shall:

(a) Maintain the name and location of all personnel on the incident.

(b) On extended attack fires, ensure the maintenance of the name and location of all personnel within their unit, division, or branch.

(c) Transfer/confirm personnel and unit information to the appropriate incident command section (ICS) command staff as soon as possible.

(d) Ensure that personnel and unit information is recorded in the command post as soon as possible.

(5) When a fire "blows up" or makes a run that crosses planned control lines, officers shall conduct an accounting of all personnel assigned to fire suppression and report any missing personnel to the incident commander.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060, 96-11-067, § 296-305-07007, filed 5/10/96, effective 1/1/97. Statutory Authority: RCW 49.17.040 and 49.17.050, 83-24-013 (Order 83-34), § 296-305-07007, filed 11/30/83; Order 77-20, § 296-305-07007, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-07009 Apparatus standards for wildland fire fighting. This section applies to wildland fire apparatus meeting the NIIMS ICS typing of a Type 3 through Type 7 engine, and intended for use combating fires occurring in natural vegetation or occurring in natural vegetation and threatening improvements. See Appendix D for equipment types.

(1) In a wildland fire, an engine may provide the primary protection for a crew in the event of unexpected fire behavior or an action that places the engine crew in a position of being exposed to heat and smoke.

(2) Apparatus speed shall be determined to be safe if in the judgment of the officer in charge, the following are taken into consideration:

(a) The particular wildland fire attack methods being utilized including, but not limited to the nature of the fire, the type of terrain, weather conditions, equipment conditions, and whether personnel are positioned in wildland fire fighting enclosures;

(b) The forgoing provision shall not relieve a driver from the duty to drive with due regard for the safety of all persons in all conditions;

(c) Nor shall such provision protect the driver from the consequences of his/her reckless disregard for the safety of others.

(3) Because of the sheltering offered by an engine, the following minimum standards shall be complied with:

(a) The number of individuals working/assigned as an engine crew shall not exceed the manufacturer's cab capacity.

(b) Any time an engine is moved when not directly attacking a fire, personnel shall ride in the vehicle's enclosed cabin area, in a seat-belted location, or be off the vehicle.

(c) Any time engines are used in a mobile attack configuration, and personnel other than the driver are on the apparatus, personnel shall ride in the manufacturer's enclosed cabin, or use the personnel restraints and enclosures identified in WAC 296-305-07011.

(d) All personnel working on or around engines in a ground mobile attack mode or in riding positions shall have visual or voice contact with the driver.

(e) Vehicles operating in smoke or dust shall have their headlights, and if so equipped, a flashing or rotating roof light illuminated.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060, 96-11-067, § 296-305-07009, filed 5/10/96, effective 1/1/97; Order 77-20, § 296-305-07009, filed 10/18/77 and Emergency Order 77-24, filed 11/17/77, effective 12/17/77.]

WAC 296-305-07011 Occupant restraints and enclosures for wildland fire fighting. (1) While in motion, the driver and passengers in the cab shall wear seatbelts.

(2) Seatbelts shall comply with U.S. Department of Transportation, Part 49 CFR, Section 571, Standards 209 and 210.

(3) Passengers on wildland vehicles shall use a safety belt or a short lanyard securely connected to the apparatus.

(a) Safety belts or lanyards shall be secured to an anchorage or structural member capable of supporting a minimum dead weight of 1500 pounds per person or a 4:1 safety factor.

(b) Safety lanyard lengths shall not allow for the fire fighter to reach the ground.

(4) Safety belts shall be constructed and maintained in compliance with ANSI A10.14-1975.

(5) Lanyards shall be a minimum of one-half inch nylon or equivalent with a nominal breaking strength of 5400 pounds.

(6) The structural components for wildland vehicle enclosures shall be constructed of metal tubing not less than 1 inch in diameter, capable of supporting a minimum of 1500 pounds per person, a 4:1 safety ratio or the equivalent. This applies to vehicle enclosures manufactured after the effective date of this chapter.

(7) The enclosure shall be constructed to a minimum toprail height of forty-two inches and shall include a midrail and either a toeboard at least four inches high or a bottom rail a maximum of six inches from the platform.

(8) Access door(s) and latching mechanisms to tail board enclosures shall be constructed and mounted to

achieve structural integrity comparable to the remainder of the enclosure.

(9) A strap or butt-bar utilized for the fourth side of the enclosure shall be a minimum of a four-inch nylon strap capable of supporting 1500 pounds dead weight.

(10) Fire fighters while actively fighting a fire in the mobile attack mode shall remain in a three-sided enclosure and use a safety lanyard. When actively fighting a fire in the mobile attack mode, fire fighters shall remain in a four-sided enclosure but the use of a lanyard is optional and should follow the fire department's operating procedures.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-07011, filed 5/10/96, effective 1/1/97.]

WAC 296-305-07013 Equipment for wildland fire fighting.

Note: Equipment is considered in this section as those items not configured as a part or portion of the vehicle body.

(1) All equipment on an apparatus shall be carried in an enclosed compartment or otherwise securely mounted on the apparatus and guarded, so that individuals can not accidentally come in contact with equipment that may injure them.

(2) All hand tools, when not in use, shall have appropriate covers and guards to prevent injury.

(3) Wildland fire fighters whose duties require them to operate a power chain saw shall wear flexible ballistic nylon pads, sewn or otherwise fastened into the trousers, or other equivalent protection that shall protect the vulnerable areas of the legs. Additional trouser, eye, hearing, face and head protection as required by this chapter shall be worn.

(4) Employees shall not use the chainsaw to cut directly overhead, or at a distance that would require the operator to relinquish a safe grip on the saw.

(5) Only personnel trained in firing equipment shall handle and use such equipment, and observe the manufacturers' recommendations.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-07013, filed 5/10/96, effective 1/1/97.]

WAC 296-305-07015 Aircraft operations for fighting wildland fires. (1) Whenever fixed wing and rotary wing aircraft are being utilized on an incident, personnel trained in air operations management shall be assigned by the incident commander/operations section chief.

(2) Prior to the initiation of air operations, all personnel operating in close proximity to an air drop shall be notified of such activity.

(3) Personnel shall not intentionally operate in an area where it can reasonably be expected that they may be hit with retardants or suppressants from fixed wing or rotary aircraft.

(4) Radio communications shall be maintained between an aircraft/air attack officer and the appropriate ground officer.

(5) Personnel assigned to ride in rotary wing aircraft shall be briefed in the correct approach, riding and off-loading procedures for the particular type of aircraft.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-07015, filed 5/10/96, effective 1/1/97.]

WAC 296-305-07017 First-aid for wildland fire fighters. (1) At all wildland fires, members shall be provided with a minimum of one quart per two-hour time period of electrolyte drinks or potable water.

(2) Officers at wildland fires shall be trained in the symptoms of heat-related disorders and shall observe their crews for such behavior. Appropriate action shall be taken in the event a crew member displays such symptoms.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-07017, filed 5/10/96, effective 1/1/97.]

WAC 296-305-07019 Training for wildland fire fighting. (1) This section shall apply to all personnel and agencies called on to provide services at any fire defined as a "wildland fire."

(2) This section shall not apply to suppression actions taken on fires prior to the fire meeting the definition of a "wildland fire."

(3) Suppression personnel assigned to a wildland fire shall be trained to a NWCG Fire Fighter level II or a comparable class of training.

(a) "Comparable" training shall be determined by the employer.

(b) Nothing in this section shall preclude the use of local residents, affected parties or contracted fire fighting resources to suppress wildland fires if they are under the direct supervision of a qualified fire line officer.

(4) Supervisory personnel shall be trained to a level commensurate to the position and responsibility they are to assume.

(5) All personnel will be trained and capable of demonstrating competency in utilizing the Incident Command System (ICS).

(6) All suppression personnel shall annually review the Standard Operating Safety Procedures. See Appendix D.

[Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 96-11-067, § 296-305-07019, filed 5/10/96, effective 1/1/97.]

WAC 296-305-08000 Appendices. These appendices are nonmandatory and are included to reference and information purposes only.

Appendix A — Recommended cleaning procedures for protective turnout clothing and station uniforms. (1) Protective clothing should be washed separately from other garments.

(2) Do not use chlorine bleach (sodium hypochlorite) as this will adversely affect the tear strength of your protective clothing and lessen its life. Oxygenated bleaches such as Liquid Clorox II, and Vivid may be used.

(3) Protective clothing may be spot treated or pretreated for hard to remove stains with products such as liquid Spray and Wash, liquid Tide, liquid dishwashing detergent or liquid Shout.

Note: The use of brand names is intended only to indicate a type of cleaning agent. All products listed by name must be used in accordance with the manufacturer's recommendations. Use of a brand name does not constitute an endorsement nor does omission of a particular product brand imply that a product is inferior. Solvents should not be used as they lessen the life of the garment, reduce visibility on the trim, and degrade leather.

(4) When pretreating or spot treating a garment, apply the detergent onto the soiled area. Gently rub the fabric together until a light foam appears on the surface. Use a soft bristle brush (toothbrush type) and scrub the area for about one and one-half minutes. Reapply liquid detergent onto the soiled area and place the garment into the washing machine.

(5) When cleaning turnout clothing the garment should be turned inside out, the hooks and dees fastened, the liner removed, and the garment placed in a laundry bag. These instructions can be used for cleaning any wash loads in a large capacity (sixteen gallon) top loading or front loading machine. Load the machine with any one of the following combinations - do not overload:

- (a) One protective coat and one pair of trousers.
- (b) Two protective coats.
- (c) Two protective pair of trousers.

Note: Heavily soiled garments should be treated as outlined in (4).

(6) While the washing machine is filling with hot water (temperature between 120 degrees F and 130 degrees F), add one-half cup (four ounces) of liquid oxygenated bleach and one cup (eight ounces) of liquid detergent.

- (a) Fill washing machine to highest water level,
- (b) Add garments to be washed,
- (c) Set washing machine for normal cycle, cotton white, or similar setting.

(d) Machines should be programmed for a double rinse. If the machine will not automatically double rinse, a complete second cycle can be run without adding detergent or oxygenated bleach. Double rinse helps remove any residual dirt and ensures detergent removal.

(e) Remove garments from washing machine when done and dry by hanging in a shaded area that receives good cross ventilation, or hang on a line and use a fan to circulate air. A water extractor may be utilized.

(f) After the garments have been removed, run the laundry machine empty or with a dummy (rag) load with detergent at least once; but preferably several times to purge the machine of any residue.

(7) Inspect and examine the trim as to the effectiveness of the trim performance under daytime and nighttime conditions. It is important that a high visibility be maintained at all possible orientations to the light source.

(8) The above procedures can be used for any article of clothing issued that is not contaminated with bloodborne pathogens or any other infectious disease. For clothing exposed to hazardous materials, consult the manufacturer or the appropriate decontamination document.

(9) Procedure for clothing (except wool clothing) that has been exposed to bloodborne pathogens or infectious diseases.

(a) Disposable gloves should be used when handling contaminated clothing.

(b) Each station should have an area designated for the cleaning of equipment. The area designated should not be near kitchen, living, sleeping, or personal hygiene areas.

(c) Contaminated clothing should be handled as little as possible with a minimum of agitation. Contaminated clothing should be cleaned as soon as possible. When the on-coming shift has to clean contaminated clothing for the off-going shift, all contaminated clothing should be stored in

red biohazard bags, properly sealed to prevent the spread of potential contamination.

(d) To clean clothing that has been contaminated, a germicidal detergent should be used. Such germicidal should be EPA approved and effective as staphylocidal, pseudomonacidal, virucidal, and fungicidal detergent.

(e) The germicidal detergent is intended to be a complete disinfecting and cleaning agent when mixed according to the manufacturer's directions. Do not add any chemical or detergent to the germicidal solution. After the clothing has been disinfected the clothing should be washed as outlined under normal use.

(f) Wool uniforms should be spot cleaned, placed in the red biohazard bags and sent to an industrial laundry for cleaning.

(10) Helmets, gloves, hoods, and boots should be cleaned as follows:

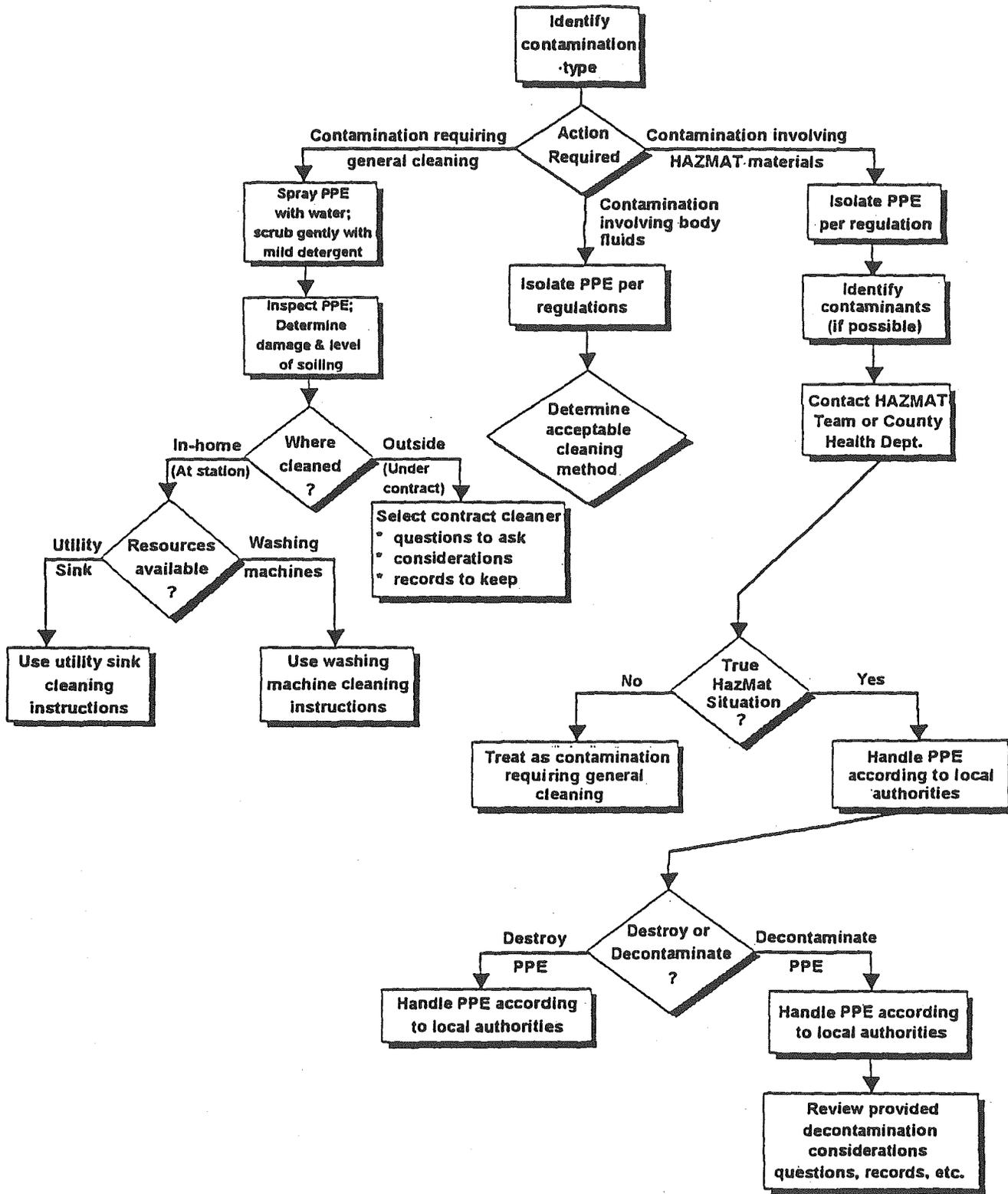
(a) Preclean using a germicidal solution and scrub all contaminated areas with a soft bristled brush. Rinse with clean water. Dispose of the precleaning solution by pouring it down the drain in the cleaning area.

(b) Using a fresh germicidal solution, repeat the above procedure allowing the areas to remain wet for a minimum of fifteen minutes. Double rinse with clean water and air dry. Dispose of the solution by pouring it down the drain in the cleaning area.

(c) For gloves, use a third fresh water rinse, squeezing and rinsing several times. Dispose of the solution by pouring it down the drain in the cleaning area.

(11) Front loading industrial laundry machines are designed for the type of cleaning required for protective clothing. Machines are available from Milnor, Model 30015C6M-AAC, for washing; or a Huabsch Originator, Model 3705H, for a dryer.

Note: The use of brand names is intended only to indicate a type of cleaning equipment. All products listed by name must be used in accordance with the manufacturer's recommendations. Use of a brand name does not constitute an endorsement nor does omission of a particular product brand imply that a product is inferior.



PPE Cleaning and Decontamination Decision-Making Process

Appendix B — Life safety ropes. (1) Life safety rope may be significantly weakened by abrasion, misuse, contamination, wear, and stresses approaching its breaking strength, particularly impact loading. Since there are no approved

methods to service test a rope without compromising its strength, rope rescue and training operations should be carefully observed and monitored for conditions that could cause immediate failure or result in undetectable damage to the rope.

(2) If a rope has been used in a situation that could not be supervised or where potential damage may have occurred, it must be removed from service and destroyed.

(3) It is important that ropes be inspected for signs of wear by qualified individuals after each use. If indication of wear or damage are noted, or if the rope has been stressed in excess of the manufacturer's recommendation or impact loaded, it must be destroyed.

(4) The destruction of the rope means that it must be removed from service and altered in such a manner that it could not be mistakenly used as a life safety rope. This alteration could include disposing of the rope, or removal of identifying labels and attachments, and cutting the rope into short lengths that could be used for utility purposes.

(5) The assignment of "disposable" life safety ropes to members or to vehicles has proved to be an effective system to manage ropes that are provided for emergency use and are used infrequently. Special rescue teams, which train frequently and use large quantities of rope, should include members who are qualified to manage and evaluate the condition of their ropes and determine the limitations upon their reuse.

Appendix C — Decontamination. (1) A decontamination area should be established whenever civilians or fire department personnel have had known or suspected exposure to toxic chemicals.

(2) Such decontamination areas should be established before any personnel are allowed to enter the "Hot" zone.

(3) The decontamination area should be set up using the following guidelines:

(a) The decontamination area should be located uphill, upwind and at a right angle to the "Hot" zone.

(b) The decontamination area entry/exit point and boundaries should be clearly marked using flagging tape, ropes, cones, etc.

(3) Visqueene should be spread on the ground in the decontamination area to control runoff.

(4) The decontamination process is divided into stations. In most cases it will not be necessary to utilize all the stations. The decision to use all or part of the stations should be based on the following factors:

(a) The hazards associated with the product involved.

(b) The estimated levels of contamination.

(c) The type of protective equipment worn by contaminated responders.

(d) Recommendations from outside sources such as, but not limited to CHEMTREC, the agency for toxic substance and disease registry, poison control centers or the manufacturer of the product.

(5) The following is a list of all the stations in a nine-step decontamination area set up for a worst case scenario involving a hazardous materials response team member whose chemical suit has been breached:

(a) Station #1 - Segregated equipment drop: Contaminated equipment that will be used again in the "Hot" zone, disposed of, or decontaminated at a later time or place, will be deposited here.

(b) Station #2 - Wash/rinse: Entry personnel will be washed with appropriate decontamination solution and rinsed with water by attendant(s) to remove gross contamination.

This station may consist of multiple wash/rinse steps depending on the severity of the hazards involved.

(c) Station #3 - Outer protective clothing removal: Attendant(s) will remove the outer protective clothing from entry personnel being cautious to avoid touching the inside of the suit while removing it. Protective clothing that has been removed at this step shall be placed in an overpack or other appropriate container for later testing and further decontamination, if needed.

(d) Station #4 - Removal of SCBA: The entry personnel are assisted in removing their SCBA by an attendant. The SCBA facepiece should be left in place and the low pressure hose held away from any potentially contaminated inner clothing.

(e) Station #5 - Removal of inner clothing: All clothing worn inside the suit must be removed in cases where the suit has been penetrated and the entry personnel are contaminated.

(f) Station #6 - Personal shower: Entry personnel should wash and rinse entire body with mild soap and water. Contain runoff water if possible, however this is an emergency situation and containment is secondary to removing contaminants from personnel.

(g) Station #7 - Drying off: Entry personnel that have showered should dry off using towels or whatever is available. Items used should be placed in an appropriate container for disposal. Emergency clothing such as disposable coveralls should be provided.

(h) Station #8 - Medical evaluation: Entry personnel should be evaluated by paramedics - checking vital signs including temperature and level of consciousness. Records of the evaluation must be kept and given to the team safety officer to be included in the members exposure records.

(i) Station #9 - Transport to emergency room: Any personnel exhibiting any signs or symptoms of exposure should be transported to the emergency room for evaluation and observation.

(6) The hazardous materials response team van should carry premeasured packets of decontamination solution mixes for the purpose of decontaminating chemical protective clothing and other equipment at the scene of a hazardous materials emergency. These solutions are not to be used to decontaminate turnouts or exposed skin under any circumstances.

(7) The primary solution used will be a simple detergent and water mixture. Other special decontamination solution mixes will only be used in those situations when it is determined that the detergent and water solution is inappropriate.

(8) Contaminated civilians that are exhibiting signs or symptoms of exposure should be treated as patients. Due to the risk of secondary contamination, all patients should undergo emergency field decontamination at the scene before being evaluated by medical personnel or being transported to the emergency room. Medical personnel should not accept any patient that has not been grossly decontaminated.

(9) The emergency field decontamination process should consist of removing the clothing from all affected body parts of the exposed person and flushing with copious quantities of water from a garden hose or low pressure one and three-quarter inch handline to remove gross contamination.

Patients will be flushed for up to fifteen minutes, depending on the material recommendations on patient decontamination.

(10) Members performing patient decontamination should wear, at a minimum, full turnouts and SCBA and should avoid splashes and overspray to the extent possible. They should also undergo decontamination when they have finished decontaminating the patient.

(11) Containment of the runoff water from patient decontamination is not required. Do not delay decontamination of patients to set up containment. However, some form

of privacy screen should be erected to protect the modesty of those being decontaminated.

(12) Responders that are contaminated in the process of performing rescue or other tasks will, at the minimum, be flushed with water for a minimum of one minute. Further flushing will be performed depending on the extent of contamination and subsequent adverse health effects.

Appendix D—Wildland Fire Fighting Equipment Typings.

<i>PUMP RATE GMP MINIMUM</i>	<i>TANK CAPACITY IN GALLONS</i>
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PUMPER/BRUSH ENGINE:

ICS Type 7	20	125
ICS Type 6	50	200
ICS Type 5	50	500
ICS Type 4	70	750
ICS Type 3	120	300

PUMPER/CLASS A RATED:

ICS Type 2	500	400
ICS Type 1	1000	400

Ten standard fire orders
 Fight fire aggressively but provide for safety first.
 Initiate all action based on current and expected fire behavior.

Recognize current weather conditions and obtain forecasts.

Ensure instructions are given and understood.

Obtain current information on fire status.

Remain in communication with crew members, your supervisor, and adjoining forces.

Determine safety zones and escape routes.

Establish lookouts in potentially hazardous situations.

Retain control at all times.

Stay alert, keep calm, think clearly, act decisively.

Four common denominators of tragedy fires

1. Small fires or relatively quiet sectors of large fires.
2. Light fuels.
3. Steep slopes.
4. Change in wind speed and/or direction.

"Watch Out" Situations

1. Fire not scouted and sized up.
2. In country not seen in daylight.
3. Safety zones and escape routes not identified.
4. Unfamiliar with weather and local factors influencing fire behavior.
5. Uninformed on strategy, tactics and hazards.
6. Instructions and assignments not clear.

7. No communication link with crew members or supervisor.

8. Constructing line without safe anchor point.

9. Building fire line downhill with fire below.

10. Attempting frontal assault on fire.

11. Unburned fuel between you and fire.

12. Cannot see main fire, not in contact with someone who can.

13. On a hillside where rolling material can ignite fuel below.

14. Weather becoming hotter and drier.

15. Wind increases and/or changes direction.

16. Getting frequent spot fires across line.

17. Terrain and fuels make escape to safety zones difficult.

18. Taking nap near fire line.

National Wildlife Coordinating Group Fire Fighter II Performance Tasks

1. Agency policy for wildfires.
2. Extended attack fire orientation and dispatch.
3. Inmate orientation.
4. Fire line organization.
5. Tools and equipment.
6. Firing devices.
7. Wildland water delivery systems and pump use.
8. Introduction to wildland fire behavior.
9. Fire line safety.
10. Size up and initial attack.
11. Fire line construction.

12. Wildland fire investigation.
13. Structure protection.
14. Use of foam.
15. Mop up.
16. Compass use.
17. Map use.
18. Radio communications.
19. Incident command system.
20. Basic first-aid.
21. Hazardous materials awareness.

Appendix E—Standard apparatus operation communications.

When fire fighters ride in the tiller's seat or other remote location, an electrical signal or voice communication should be installed between the tiller's seat, work station, and driver's compartment.

(1) These signals should be used between the driver and the fire fighters:

- (a) One long buzz means stop;
- (b) Two buzzes mean forward;
- (c) Three buzzes mean reverse.

(2) Before any of the above functions are undertaken, with the exception of stopping, the same signal must be both sent and received. The driver should not act without sending and receiving a confirming signal.

(3) When using hand signals, these signals are as follows:

STOP

Hold hand to the side, shoulder high, exposing palm to the driver. At night, hold hands in the same manner, with the addition of a flashlight in one hand shining at the driver. This will indicate an immediate STOP.



STOP

Hold hand to the side, shoulder high, exposing palm to the driver. At night, hold hands in the same manner, with the addition of a flashlight in one hand shining at the driver. This will indicate an immediate STOP.

RIGHT OR LEFT

Point in the desired direction with one hand and motion in a circular "come-on" gesture with the other hand at the chest level. At night direct a flashlight beam at the hand pointing in the desired direction.



RIGHT OR LEFT

Point in the desired direction with one hand and motion in a circular "come on" gesture with other at the chest level. At night, direct a flashlight beam at the hand pointing in the desired direction.

DIMINISHING CLEARANCE

Hold the hands to one side of the body indicating the approximate amount of distance the apparatus is from the obstacle. Close hands accordingly as the driver slowly maneuvers the apparatus to point where the signal indicates immediate STOP. Always allow enough for drivers reaction time.

At night, indicate in the same manner with the flashlight in the upper hands and beam directed at the palm of the other. On STOP, cover the flashlight beam with the hands.



DIMINISHING CLEARANCE

Hold the hands to one side of the body indicating the approximate amount of distance the apparatus is from the obstacle. Close hands accordingly as the driver slowly maneuvers the apparatus to point where the signal indicates immediate STOP. Always allow enough for divers reaction time. At night, indicate in the same manner with the flashlight in the upper hands and beam directed at the palm of the other. On STOP, cover the flashlight beam with the hands.

AHEAD OR BACK-UP

Hold hand directly in front, chest high, fingers on hands directed toward one another, and motion in a circular "come-on" gesture. At night hold a flashlight in one hand and direct the beam toward the other.



AHEAD OR BACK UP

Hold hand directly in front, chest high, fingers on hands directed toward one another, and motion in circular "come-on" gesture. At night hold a flashlight in one hand and direct the beam toward the other.

[Statutory Authority: RCW 49.17.010, [49.17.]050 and [49.17.]060. 96-11-067, § 296-305-08000, filed 5/10/96, effective 1/1/97.]

**Chapter 296-306 WAC
SAFETY STANDARDS FOR AGRICULTURE**

WAC

PART D—PERSONAL PROTECTIVE EQUIPMENT

296-306-060 Personal protective equipment.

PART M—FIELD SANITATION

296-306-330 Decontamination.
296-306-400 Posting requirements.
296-306-40007 Emergency medical care information.
296-306-40009 Emergency assistance.

**DISPOSITION OF SECTIONS FORMERLY
CODIFIED IN THIS CHAPTER**

296-306-003 Subsections, subdivisions, items, subitems, and segments. [Statutory Authority: RCW 49.17.040 and 49.17.050. 87-09-079 (Order 86-46), § 296-306-003, filed 4/22/87.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.

296-306-005 Foreword. [Order 75-2, § 296-306-005, filed 1/24/75.] Repealed by 87-09-079 (Order 86-46), filed 4/22/87. Statutory Authority: RCW 49.17.040 and 49.17.050.

296-306-006 Equipment approval by nonstate agency or organization. [Statutory Authority: RCW 49.17.040 and 49.17.050. 87-09-079 (Order 86-46), § 296-306-006, filed 4/22/87.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.

296-306-009 Equipment whether or not owned by, or under control of the employer. [Statutory Authority: RCW 49.17.040 and 49.17.050. 87-09-079 (Order 86-46), § 296-306-009, filed 4/22/87.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.

296-306-010 Purpose and scope. [Statutory Authority: Chapter 49.17 RCW. 95-10-045, § 296-306-010, filed 5/1/95, effective 1/16/96; 94-06-068 (Order 93-17), § 296-306-010, filed 3/2/94, effective 3/1/95; 93-07-012 (Order 92-24), § 296-

306-010, filed 3/5/93, effective 6/1/93; 89-11-035 (Order 89-03), § 296-306-010, filed 5/15/89, effective 6/30/89; 88-14-108 (Order 88-11), § 296-306-010, filed 7/6/88. Statutory Authority: RCW 49.17.040, 49.17.150, and 49.17.240. 79-08-115 (Order 79-9), § 296-306-010, filed 7/31/79; Order 75-2, § 296-306-010, filed 1/24/75.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.

296-306-01001 Cadmium. [Statutory Authority: Chapter 49.17 RCW. 93-07-044 (Order 93-01), § 296-306-01001, filed 3/13/93, effective 4/27/93.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.

296-306-012 Definitions applicable to all sections of this chapter. [Statutory Authority: Chapter 49.17 RCW. 95-10-045, § 296-306-012, filed 5/1/95, effective 1/16/96; 94-06-068 (Order 93-17), § 296-306-012, filed 3/2/94, effective 4/15/94; 93-07-012 (Order 92-24), § 296-306-012, filed 3/5/93, effective 6/1/93. Statutory Authority: RCW 49.17.040 and 49.17.050. 87-09-079 (Order 86-46), § 296-306-012, filed 4/22/87.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.

296-306-015 Variance procedures. [Statutory Authority: Chapter 49.17 RCW. 95-10-045, § 296-306-015, filed 5/1/95, effective 1/16/96; 94-06-068 (Order 93-17), § 296-306-015, filed 3/2/94, effective 4/15/94; Order 75-2, § 296-306-015, filed 1/24/75.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.

296-306-020 Serious injury reporting. [Statutory Authority: Chapter 49.17 RCW. 94-20-057 (Order 94-16), § 296-306-020, filed 9/30/94, effective 11/20/94; 94-06-068 (Order 93-17), § 296-306-020, filed 3/2/94, effective 4/15/94; Order 75-2, § 296-306-020, filed 1/24/75.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.

296-306-025 Management's responsibility. [Statutory Authority: Chapter 49.17 RCW. 95-10-045, § 296-306-025, filed 5/1/95, effective 1/16/96; 91-24-017 (Order 91-07), § 296-306-025, filed 11/22/91, effective 12/24/91. Statutory Authority: RCW 49.17.040 and 49.17.050. 87-09-079 (Order 86-46), § 296-306-025, filed 4/22/87. Statutory Authority: RCW 49.17.040, 49.17.150 and 49.17.240. 79-08-115 (Order 79-9), § 296-306-025, filed 7/31/79; Order 77-12, § 296-306-025, filed 7/11/77; Order 75-2, § 296-306-025, filed 1/24/75.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.

296-306-030 Employee's responsibility. [Order 75-2, § 296-306-030, filed 1/24/75.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.

296-306-035 Accident prevention program. [Statutory Authority: Chapter 49.17 RCW. 95-10-045, § 296-306-035, filed 5/1/95, effective 1/16/96; 93-07-012 (Order 92-24), § 296-306-035, filed 3/5/93, effective 6/1/93; Order 75-2, § 296-306-035, filed 1/24/75.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.

296-306-040 Safety bulletin board. [Statutory Authority: Chapter 49.17 RCW. 91-24-017 (Order 91-07), § 296-306-040, filed 11/22/91, effective 12/24/91; Order 75-2, § 296-306-040, filed 1/24/75.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.

296-306-045 First-aid training and certification. [Statutory Authority: Chapter 49.17 RCW. 95-10-045, § 296-306-045, filed 5/1/95, effective 1/16/96; Order 75-2, § 296-306-045, filed 1/24/75.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.

296-306-050 First-aid kit. [Statutory Authority: Chapter 49.17 RCW. 95-10-045, § 296-306-050, filed 5/1/95, effective 1/16/96; Order 75-2, § 296-306-050, filed 1/24/75.] Repealed by

- 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-055 Safe place standards. [Order 75-2, § 296-306-055, filed 1/24/75.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-057 Hand tools. [Statutory Authority: Chapter 49.17 RCW. 94-06-068 (Order 93-17), § 296-306-057, filed 3/2/94, effective 4/15/94. Statutory Authority: RCW 49.17.040 and 49.17.050. 87-09-079 (Order 86-46), § 296-306-057, filed 4/22/87.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-061 Machinery and machine guarding. [Statutory Authority: Chapter 49.17 RCW. 94-18-067, § 296-306-061, filed 9/1/94, effective 9/1/94; 93-07-012 (Order 92-24), § 296-306-061, filed 3/5/93, effective 6/1/93.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-06101 Powered saws, general requirements. [Statutory Authority: Chapter 49.17 RCW. 94-18-067, § 296-306-06101, filed 9/1/94, effective 9/1/94.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-06103 Band saws. [Statutory Authority: Chapter 49.17 RCW. 94-18-067, § 296-306-06103, filed 9/1/94, effective 9/1/94.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-06105 Radial armsaws. [Statutory Authority: Chapter 49.17 RCW. 94-18-067, § 296-306-06105, filed 9/1/94, effective 9/1/94.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-06107 Table saws. [Statutory Authority: Chapter 49.17 RCW. 94-18-067, § 296-306-06107, filed 9/1/94, effective 9/1/94.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-06109 Circular fuel wood saws. [Statutory Authority: Chapter 49.17 RCW. 94-18-067, § 296-306-06109, filed 9/1/94, effective 9/1/94.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-065 Materials handling and storage—General requirements. [Statutory Authority: Chapter 49.17 RCW. 95-10-045, § 296-306-065, filed 5/1/95, effective 1/16/96; Order 75-2, § 296-306-065, filed 1/24/75.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-070 Reserved. [Statutory Authority: Chapter 49.17 RCW. 93-07-012 (Order 92-24), § 296-306-070, filed 3/5/93, effective 6/1/93; Order 75-2, § 296-306-070, filed 1/24/75.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-075 Bench grinders. [Statutory Authority: Chapter 49.17 RCW. 94-18-067, § 296-306-075, filed 9/1/94, effective 9/1/94; Order 75-2, § 296-306-075, filed 1/24/75.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-07501 Definitions. [Statutory Authority: Chapter 49.17 RCW. 94-18-067, § 296-306-07501, filed 9/1/94, effective 9/1/94.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-07503 Use, mounting, and guarding. [Statutory Authority: Chapter 49.17 RCW. 94-18-067, § 296-306-07503, filed 9/1/94, effective 9/1/94.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-080 Guarding of hand-held portable power tools. [Statutory Authority: Chapter 49.17 RCW. 95-10-045, § 296-306-080, filed 5/1/95, effective 1/16/96; Order 75-2, § 296-306-080, filed 1/24/75.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-084 Portable abrasive wheels. [Statutory Authority: Chapter 49.17 RCW. 93-07-012 (Order 92-24), § 296-306-084, filed 3/5/93, effective 6/1/93.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-085 Fire protection and ignition sources. [Statutory Authority: Chapter 49.17 RCW. 95-10-045, § 296-306-085, filed 5/1/95, effective 1/16/96; 88-14-108 (Order 88-11), § 296-306-085, filed 7/6/88; Order 75-2, § 296-306-085, filed 1/24/75.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-08501 Scope and application. [Statutory Authority: Chapter 49.17 RCW. 95-10-045, § 296-306-08501, filed 5/1/95, effective 1/16/96.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-08503 General requirements. [Statutory Authority: Chapter 49.17 RCW. 95-10-045, § 296-306-08503, filed 5/1/95, effective 1/16/96.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-08505 Selection and distribution. [Statutory Authority: Chapter 49.17 RCW. 95-10-045, § 296-306-08505, filed 5/1/95, effective 1/16/96.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-08507 Inspection, maintenance and testing. [Statutory Authority: Chapter 49.17 RCW. 95-10-045, § 296-306-08507, filed 5/1/95, effective 1/16/96.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-08509 Employee emergency and fire prevention plans. [Statutory Authority: Chapter 49.17 RCW. 95-10-045, § 296-306-08509, filed 5/1/95, effective 1/16/96.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-090 Storage and handling of anhydrous ammonia. [Statutory Authority: Chapter 49.17 RCW. 95-10-045, § 296-306-090, filed 5/1/95, effective 1/16/96; 88-14-108 (Order 88-11), § 296-306-090, filed 7/6/88; Order 75-2, § 296-306-090, filed 1/24/75.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-09001 Storage and handling of liquefied petroleum gases. [Statutory Authority: Chapter 49.17 RCW. 95-10-045, § 296-306-09001, filed 5/1/95, effective 1/16/96.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-09003 Hazardous materials, flammable and combustible liquids, spray finishing, dip tanks. [Statutory Authority: Chapter 49.17 RCW. 95-10-045, § 296-306-09003, filed 5/1/95, effective 1/16/96.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-095 Walking working surfaces, elevated walkways and platforms. [Statutory Authority: Chapter 49.17 RCW. 95-10-045, § 296-306-095, filed 5/1/95, effective 1/16/96; Order 75-2, § 296-306-095, filed 1/24/75.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-100 Handrails. [Statutory Authority: Chapter 49.17 RCW. 95-10-045, § 296-306-100, filed 5/1/95, effective 1/16/96; Order 75-2, § 296-306-100, filed 1/24/75.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-105 Ladders. [Statutory Authority: Chapter 49.17 RCW. 95-10-045, § 296-306-105, filed 5/1/95, effective 1/16/96; 93-07-012 (Order 92-24), § 296-306-105, filed 3/5/93, effective 6/1/93; Order 75-2, § 296-306-105, filed 1/24/75.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.

- 296-306-110 Job-made ladders. [Statutory Authority: Chapter 49.17 RCW. 94-06-068 (Order 93-17), § 296-306-110, filed 3/2/94, effective 4/15/94; Order 75-2, § 296-306-110, filed 1/24/75.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-115 Bins, bunkers, hoppers, tanks, pits and trenches. [Statutory Authority: Chapter 49.17 RCW. 94-06-068 (Order 93-17), § 296-306-115, filed 3/2/94, effective 4/15/94; 93-07-012 (Order 92-24), § 296-306-115, filed 3/5/93, effective 6/1/93; Order 75-2, § 296-306-115, filed 1/24/75.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-120 Aerial manlift equipment. [Statutory Authority: Chapter 49.17 RCW. 95-10-045, § 296-306-120, filed 5/1/95, effective 1/16/96; 94-06-068 (Order 93-17), § 296-306-120, filed 3/2/94, effective 4/15/94; Order 75-2, § 296-306-120, filed 1/24/75.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-125 Gas welding and cutting. [Order 75-2, § 296-306-125, filed 1/24/75.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-130 Welding. [Order 75-2, § 296-306-130, filed 1/24/75.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-135 Arc welding and cutting. [Statutory Authority: Chapter 49.17 RCW. 95-10-045, § 296-306-135, filed 5/1/95, effective 1/16/96; Order 75-2, § 296-306-135, filed 1/24/75.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-140 Welding areas protected. [Statutory Authority: Chapter 49.17 RCW. 95-10-045, § 296-306-140, filed 5/1/95, effective 1/16/96; Order 75-2, § 296-306-140, filed 1/24/75.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-145 Electrical. [Statutory Authority: Chapter 49.17 RCW. 94-18-067, § 296-306-145, filed 9/1/94, effective 9/1/94; 93-07-012 (Order 92-24), § 296-306-145, filed 3/5/93, effective 6/1/93; Order 76-28, § 296-306-145, filed 9/28/76; Order 75-2, § 296-306-145, filed 1/24/75.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-14501 Purpose, scope and application. [Statutory Authority: Chapter 49.17 RCW. 94-18-067, § 296-306-14501, filed 9/1/94, effective 9/1/94.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-14503 Definitions. [Statutory Authority: Chapter 49.17 RCW. 94-18-067, § 296-306-14503, filed 9/1/94, effective 9/1/94.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-14505 Temporary lighting and wiring. [Statutory Authority: Chapter 49.17 RCW. 94-18-067, § 296-306-14505, filed 9/1/94, effective 9/1/94.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-14507 Guarding of live parts. [Statutory Authority: Chapter 49.17 RCW. 94-18-067, § 296-306-14507, filed 9/1/94, effective 9/1/94.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-14509 Equipment installation and maintenance. [Statutory Authority: Chapter 49.17 RCW. 94-18-067, § 296-306-14509, filed 9/1/94, effective 9/1/94.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-14511 Proximity to overhead lines. [Statutory Authority: Chapter 49.17 RCW. 94-18-067, § 296-306-14511, filed 9/1/94, effective 9/1/94.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-14513 Safeguards for personal protection. [Statutory Authority: Chapter 49.17 RCW. 94-18-067, § 296-306-14513, filed 9/1/94, effective 9/1/94.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-14515 Selection and use of work practices. [Statutory Authority: Chapter 49.17 RCW. 94-18-067, § 296-306-14515, filed 9/1/94, effective 9/1/94.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-150 Slow-moving vehicles. [Order 75-2, § 296-306-150, filed 1/24/75.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-155 General requirements for maintenance of farm motor vehicles and equipment. [Statutory Authority: Chapter 49.17 RCW. 95-10-045, § 296-306-155, filed 5/1/95, effective 1/16/96; Order 75-2, § 296-306-155, filed 1/24/75.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-160 Vehicles. [Statutory Authority: Chapter 49.17 RCW. 94-06-068 (Order 93-17), § 296-306-160, filed 3/2/94, effective 4/15/94; Order 75-2, § 296-306-160, filed 1/24/75.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-165 General requirements for all agricultural equipment. [Statutory Authority: Chapter 49.17 RCW. 95-10-045, § 296-306-165, filed 5/1/95, effective 1/16/96; 93-07-012 (Order 92-24), § 296-306-165, filed 3/5/93, effective 6/1/93; 91-24-017 (Order 91-07), § 296-306-165, filed 11/22/91, effective 12/24/91; 89-11-035 (Order 89-03), § 296-306-165, filed 5/15/89, effective 6/30/89; Order 76-28, § 296-306-165, filed 9/28/76; Order 75-2, § 296-306-165, filed 1/24/75.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-170 Auger conveying equipment. [Statutory Authority: Chapter 49.17 RCW. 95-10-045, § 296-306-170, filed 5/1/95, effective 1/16/96; Order 76-28, § 296-306-170, filed 9/28/76; Order 75-2, § 296-306-170, filed 1/24/75.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-175 Farm field equipment guarding. [Statutory Authority: Chapter 49.17 RCW. 94-18-067, § 296-306-175, filed 9/1/94, effective 9/1/94; Order 76-28, § 296-306-175, filed 9/28/76.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-180 Farmstead equipment. [Statutory Authority: Chapter 49.17 RCW. 94-18-067, § 296-306-180, filed 9/1/94, effective 9/1/94; Order 76-28, § 296-306-180, filed 9/28/76.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-200 Rollover protective structures (ROPS) for tractors used in agricultural operations. [Statutory Authority: Chapter 49.17 RCW. 94-06-068 (Order 93-17), § 296-306-200, filed 3/2/94, effective 3/1/95; 93-07-012 (Order 92-24), § 296-306-200, filed 3/5/93, effective 6/1/93; 89-11-035 (Order 89-03), § 296-306-200, filed 5/15/89, effective 6/30/89. Statutory Authority: RCW 49.17.040 and 49.17.050. 83-15-017 (Order 83-19), § 296-306-200, filed 7/13/83, effective 9/12/83; 82-08-026 (Order 82-10), § 296-306-200, filed 3/30/82; Order 76-28, § 296-306-200, filed 9/28/76.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-250 Protective frames for wheel-type agricultural tractors—Test procedures and performance requirements—Purpose. [Order 76-28, § 296-306-250, filed 9/28/76.] Repealed by

- 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-25003 Types of tests. [Order 76-28, § 296-306-25003, filed 9/28/76.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-25005 Description. [Order 76-28, § 296-306-25005, filed 9/28/76.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-25007 Test procedures. [Statutory Authority: Chapter 49.17 RCW. 94-06-068 (Order 93-17), § 296-306-25007, filed 3/2/94, effective 4/15/94; Order 76-28, § 296-306-25007, filed 9/28/76.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-25009 Performance requirements. [Order 76-28, § 296-306-25009, filed 9/28/76.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-25013 Protective enclosures for wheel-type agricultural tractors—Test procedures and performance requirements—Purpose. [Order 76-28, § 296-306-25013, filed 9/28/76.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-25017 Types of tests. [Order 76-28, § 296-306-25017, filed 9/28/76.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-25019 Description. [Order 76-28, § 296-306-25019, filed 9/28/76.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-25021 Test procedures. [Order 76-28, § 296-306-25021, filed 9/28/76.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-25023 Performance requirements. [Order 76-28, § 296-306-25023, filed 9/28/76.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-25095 Exhibit B—Figures C-1 thru C-16. [Order 76-28, Exhibit B (codified as WAC 296-306-25095), filed 9/28/76.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-260 Rollover protective structures (ROPS) for material handling equipment. [Statutory Authority: Chapter 49.17 RCW. 94-06-068 (Order 93-17), § 296-306-260, filed 3/2/94, effective 4/15/94; 91-11-070 (Order 91-01), § 296-306-260, filed 5/20/91, effective 6/20/91; Order 76-28, § 296-306-260, filed 9/28/76.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-26001 Minimum performance criteria for rollover protective structures for designated scrapers, loaders, dozers, graders, and crawler tractors. [Statutory Authority: Chapter 49.17 RCW. 95-10-045, § 296-306-26001, filed 5/1/95, effective 1/16/96; 93-07-012 (Order 92-24), § 296-306-26001, filed 3/5/93, effective 6/1/93; Order 76-28, § 296-306-26001, filed 9/28/76.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-265 Protective frame (ROPS) test procedures and performance requirements for wheel-type agricultural and industrial tractors used in agriculture. [Statutory Authority: Chapter 49.17 RCW. 94-06-068 (Order 93-17), § 296-306-265, filed 3/2/94, effective 4/15/94; 93-07-012 (Order 92-24), § 296-306-265, filed 3/5/93, effective 6/1/93; 91-11-070 (Order 91-01), § 296-306-265, filed 5/20/91, effective 6/20/91; Order 76-28, § 296-306-265, filed 9/28/76.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-270 Overhead protection for operators of agricultural and industrial tractors. [Statutory Authority: Chapter 49.17 RCW. 93-07-012 (Order 92-24), § 296-306-270, filed 3/5/93, effective 6/1/93; Order 76-28, § 296-306-270, filed 9/28/76.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-27095 Exhibit B—Figures C-17 through C-34. [Statutory Authority: Chapter 49.17 RCW. 93-07-012 (Order 92-24), § 296-306-27095, filed 3/5/93, effective 6/1/93; 91-11-070 (Order 91-01), § 296-306-27095, filed 5/20/91, effective 6/20/91; 87-24-051 (Order 87-24), § 296-306-27095, filed 11/30/87; Order 76-28, Exhibit B (codified as WAC 296-306-27095), filed 9/28/76.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-275 Seatbelts. [Order 76-28, § 296-306-275, filed 9/28/76.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-300 Field sanitation—Scope. [Statutory Authority: RCW 49.17.040 and 49.17.050. 87-09-079 (Order 86-46), § 296-306-300, filed 4/22/87.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-310 Field sanitation—Definitions. [Statutory Authority: Chapter 49.17 RCW. 91-11-070 (Order 91-01), § 296-306-310, filed 5/20/91, effective 6/20/91; 89-11-035 (Order 89-03), § 296-306-310, filed 5/15/89, effective 6/30/89. Statutory Authority: RCW 49.17.040 and 49.17.050. 87-09-079 (Order 86-46), § 296-306-310, filed 4/22/87.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-320 Field sanitation—Requirements. [Statutory Authority: Chapter 49.17 RCW. 91-11-070 (Order 91-01), § 296-306-320, filed 5/20/91, effective 6/20/91; 89-11-035 (Order 89-03), § 296-306-320, filed 5/15/89, effective 6/30/89; 88-23-054 (Order 88-25), § 296-306-320, filed 11/14/88. Statutory Authority: RCW 49.17.040 and 49.17.050. 87-09-079 (Order 86-46), § 296-306-320, filed 4/22/87.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-40003 General requirements. [Statutory Authority: Chapter 49.17 RCW. 93-07-012 (Order 92-24), § 296-306-40003, filed 3/5/93, effective 6/1/93. Statutory Authority: Chapters 49.17 and 49.70 RCW. 90-11-023 (Order 89-19), § 296-306-40003, filed 5/9/90, effective 7/1/90.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-40005 Pesticides record form. [Statutory Authority: Chapters 49.17 and 49.70 RCW. 90-11-023 (Order 89-19), § 296-306-40005, filed 5/9/90, effective 7/1/90.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.
- 296-306-40011 Cholinesterase monitoring for employees mixing, loading, or applying organophosphate pesticides, and/or early reentering of treated areas. Nonmandatory. [Statutory Authority: Chapter 49.17 RCW. 93-07-012 (Order 92-24), § 296-306-40011, filed 3/5/93, effective 6/1/93.] Repealed by 96-22-048, filed 10/31/96, effective 12/1/96. Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060.

PART D—PERSONAL PROTECTIVE EQUIPMENT

WAC 296-306-060 Personal protective equipment.

(1) Employers shall make certain that employees are protected from injury or impairment of any bodily function that might occur through absorption, inhalation or physical contact of any substance, vapor, radiation or mechanical irritant. Adequate protective equipment for eyes, face, head and extremities, protective clothing, respiratory devices,

shields and barriers shall be provided at no cost to the employees and used wherever appropriate. Such equipment shall be maintained in sanitary and reliable condition.

(2) If employees provide their own protective equipment, the employer shall require that such equipment be adequate, and properly maintained and sanitary.

(3) Eye protectors shall be required wherever workers are exposed to flying objects, welding or cutting glare, injurious liquids, injurious radiation or any combination of these. Eye protectors shall meet the criteria of the American National Standard for Occupational and Educational Eye and Face Protection.

(a) The employer shall provide and require employees to wear eye protection and gloves whenever opening or pouring out pesticide containers, mixing, loading, or transferring pesticides or pesticide solutions, or washing or cleaning pesticide containers or tanks containing pesticides or applying pesticides with hand-held equipment, or adjusting, cleaning, or repairing pesticide application equipment containing pesticides.

(b) Eye protection and gloves as required above shall be initially provided at no cost to the employee, including replacement due to normal wear and tear thereafter.

(c) Unless otherwise stated by the pesticide label, eye protection shall be either goggles, splash face shields, safety glasses with front, brow, and temple protection, or a full-face respirator.

(d) Unless otherwise stated by the pesticide label, gloves shall be made of chemical resistant material as defined in this section, such as neoprene, nitrile rubber, or PVC. Leather, cotton, or other absorbent-type gloves shall not be worn.

(e) When gloves must be used as required in this section, employees shall be provided with clean gloves at the beginning of the work shift and at any time during the shift if the gloves become contaminated on the inside. Clean gloves are unused gloves or previously used gloves that have been washed with soap and water, inside and outside.

(4) The respiratory protection requirements of the general occupational health standards, chapter 296-62 WAC, shall apply when respiratory protection is required by the pesticide label or when a permissible exposure limit of chemicals listed in the air contaminant standards of chapter 296-62 WAC are exceeded, or when respiratory protection is used to protect employees in oxygen-deficient atmospheres, or when respirators are used for emergency or rescue use.

(5) Pesticide personal protective equipment requirements.

(a) Any employee who works with or is exposed to pesticides shall use the clothing and personal protective equipment specified on the labeling for use of the product.

(b) Personal protective equipment (PPE) for pesticide use means devices and apparel that are required by pesticide labeling to be worn to protect the body from contact with pesticides or pesticide residues, including, but not limited to, coveralls, long-sleeved shirts, long-legged pants, and socks, chemical-resistant suits, chemical-resistant gloves, chemical-resistant footwear, respiratory protection devices, chemical-resistant aprons, chemical-resistant headgear, and protective eyewear.

(c) Provision. When personal protective equipment is specified by the labeling of any pesticide for any handling activity, the employer shall provide the appropriate personal protective equipment in clean and operating condition at no cost to the employee, including replacement due to normal wear and tear. Normal work clothing, including long-sleeved shirts, long-legged pants, and socks, do not need to be provided by employers.

(i) When "chemical-resistant" apparel is specified on the product labeling, it shall be made of material that allows no measurable movement of the pesticide being used through the material during use.

(ii) When "waterproof personal protective equipment" are specified on the product labeling, they shall be made of material that allows no measurable movement of water or aqueous solutions through the material during use.

(iii) When a "chemical-resistant suit" is required by the product labeling, it shall be a loose-fitting, one- or two-piece chemical-resistant garment that covers, at a minimum, the entire body except head, hands, and feet.

(iv) When "coveralls" are specified on the product labeling, they shall be a loose-fitting, one- or two-piece garment, such as a cotton or cotton and polyester coveralls that cover, at a minimum, the entire body except head, hands, and feet. The pesticide product labeling may specify that coveralls be worn over another layer of clothing.

(v) Gloves shall be of the type specified by the product labeling. Gloves or glove linings made of leather, cotton, or other absorbent material may not be worn for the handling activities unless they are listed on the product labeling as acceptable for such use.

(vi) When "chemical-resistant footwear" is specified by the product labeling, one of the following types of footwear must be worn:

(A) Chemical-resistant shoes.

(B) Chemical-resistant boots.

(C) Chemical-resistant shoe coverings worn over shoes or boots.

(vii) When "protective eyewear" is specified by the product labeling, one of the following types of eyewear must be worn:

(A) Goggles.

(B) Face shield.

(C) Safety glasses with front, brow, and temple protection.

(D) Full-face respirator.

(viii) When a "chemical-resistant apron" is specified by the product labeling, an apron that covers the front of the body from mid-chest to the knees shall be worn.

(ix) When a respirator is specified by the product labeling, it shall be appropriate for the pesticide product used and for the activity to be performed. The employer shall assure that the respirator fits correctly by using procedures consistent with WAC 296-62-071. If the label does not specify the type of respirator to be used, it shall meet the requirements of WAC 296-62-071.

(x) When "chemical-resistant headgear" is required, it shall be either a chemical-resistant hood or a chemical-resistant hat with a wide brim.

(d) Exceptions to personal protective equipment specified on product labeling.

(i) Body protection.

(A) A chemical-resistant suit may be substituted for "coveralls," and any requirement for an additional layer of clothing beneath is waived.

(B) A chemical-resistant suit may be substituted for "coveralls" and a chemical-resistant apron.

(ii) Boots. If chemical-resistant footwear with sufficient durability and a tread appropriate for wear in rough terrain is not obtainable, then leather boots may be worn in such terrain.

(iii) Gloves. If chemical-resistant gloves with sufficient durability and suppleness are not obtainable, then during handling activities with roses and other plants with sharp thorns, leather gloves may be worn over chemical-resistant glove liners. However, once leather gloves are worn for protection from pesticide exposure, thereafter they only shall be worn with chemical-resistant liners and they shall not be worn for any other use.

(iv) Closed systems. If handling tasks are performed using properly functioning systems designed by the manufacturer to enclose the pesticide to prevent it from contacting handlers or other persons and such systems are used and are maintained in accordance with that manufacturer's written operating instructions, exceptions to labeling-specified personal protective equipment for the handling activity are permitted as provided in (d)(iv)(A) and (B) of this subsection.

(A) Persons using a closed system to mix or load pesticides with a signal word of DANGER or WARNING may substitute a long-sleeved shirt, long-legged pants, shoes, socks, chemical-resistant apron, and any protective gloves specified on the labeling for handlers for the labeling-specified personal protective equipment.

(B) Persons using a closed system to mix or load pesticides other than those in (d)(iv)(A) of this subsection or to perform other handling tasks may substitute a long-sleeved shirt, long-legged pants, shoes, and socks for the labeling-specified personal protective equipment.

(C) Persons using a closed system that operates under pressure shall wear protective eyewear.

(D) Persons using a closed system shall have all personal protective equipment specified on the pesticide label immediately available for use in an emergency.

(v) Enclosed cabs. If handling tasks are performed from inside a cab that has a nonporous barrier which totally surrounds the occupants of the cab and prevents contact with pesticides outside the cab, exceptions to personal protective equipment specified on the product labeling for that handling activity are permitted as provided in (d)(v)(A) through (C) of this section.

(A) Persons occupying an enclosed cab may substitute a long-sleeved shirt, long-legged pants, shoes, and socks for the labeling-specified personal protective equipment. If a respiratory protection device is specified on the pesticide product labeling for the handling activity, it must be worn.

(B) Persons occupying an enclosed cab that has a properly functioning ventilation system which is used and maintained in accordance with the manufacturer's written operating instructions and which is declared in writing by the manufacturer and by a governmental agency to provide respiratory protection equivalent to or greater than a dust/mist filtering respirator may substitute a long-sleeved shirt, long-legged pants, shoes, and socks for the labeling-specified

personal protective equipment. If a respiratory protection device other than a dust/mist filtering respirator is specified on the pesticide product labeling, it must be worn.

(C) Persons occupying an enclosed cab that has a properly functioning ventilation system which is used and maintained in accordance with the manufacturer's written operating instructions and which is declared in writing by the manufacturer and by a governmental agency to provide respiratory protection equivalent to or greater than the vapor- or gas-removing respirator specified on the pesticide product labeling may substitute a long-sleeved shirt, long-legged pants, shoes, and socks for the labeling-specified personal protective equipment. If an air-supplying respirator or a self-contained breathing apparatus (SCBA) is specified on the pesticide product labeling, it must be worn.

(D) Persons occupying an enclosed cab shall have all labeling-specified personal protective equipment immediately available inside the cab and shall wear such personal protective equipment if it is necessary to exit the cab and contact pesticide-treated surfaces in the treated area. Once personal protective equipment is worn in the treated area, it may not be worn into or taken into the cab. It must be removed before reentering the cab and must be stored outside the cab or be taken into the cab only in a closed chemical-resistant container. Occupants of an enclosed cab may exit and reenter the cab for the purposes of limited repairs or adjustments to the equipment after spraying is stopped and the vehicle is moved at least 20 feet outside the treated area.

(e) Use of personal protective equipment.

(i) The employer shall assure that personal protective equipment is used correctly for its intended purpose and is used according to the manufacturer's instructions.

(ii) The employer shall assure that, before each use, all personal protective equipment is inspected for leaks, holes, tears, or worn places, and any damaged equipment is repaired or discarded.

(iii) The employee shall use the provided personal protective equipment in accordance with instructions and training received.

(iv) The employee shall notify the employer of any defects in personal protective equipment or when the equipment becomes contaminated.

(f) Cleaning and maintenance of personal protective equipment.

(i) The employer shall launder or have laundered all label-specified personal protective equipment, including long-sleeved shirts, long-legged pants and socks, according to the manufacturer's instructions or pesticide product labeling instructions before each day of reuse. In the absence of any such instructions, it shall be washed thoroughly in detergent and hot water.

(ii) If any personal protective equipment cannot be cleaned properly, the employer shall dispose of the personal protective equipment in accordance with any applicable federal, state, and local regulations. Coveralls or other absorbent materials that have been drenched or heavily contaminated with an undiluted pesticide that has the signal word DANGER or WARNING on the label shall not be reused.

(iii) The employer shall assure that contaminated personal protective equipment is kept separately and washed separately from any other clothing or laundry.

(iv) The employer shall assure that all clean personal protective equipment shall be dried thoroughly before being stored or put in a well-ventilated place to dry.

(v) The employer shall assure that all personal protective equipment is stored separately from personal clothing and apart from pesticide-contaminated areas.

(vi) The employer shall assure that when dust/mist filtering respirators are used, the filters shall be replaced:

(A) When breathing resistance becomes excessive.

(B) When the filter element has physical damage or tears.

(C) According to manufacturer's recommendations or pesticide product labeling, whichever is more frequent.

(D) In the absence of any other instructions or indications of service life, after eight hours of use.

(vii) The employer shall assure that when gas- and vapor-removing respirators are used the gas- or vapor-removing canisters or cartridges shall be replaced:

(A) At the first indication of odor, taste, or irritation.

(B) According to the manufacturer's recommendations or pesticide product labeling, whichever is more frequent.

(C) In the absence of any other instructions or indications of service life, after eight hours of use.

(viii) The employer shall inform any person who cleans or launders personal protective equipment for the employer and is not the wearer:

(A) That such equipment may be contaminated with pesticides.

(B) The name of the pesticides that may have contaminated this personal protective equipment.

(ix) The employer shall assure that handlers have clean place(s) away from pesticide-storage and pesticide-use areas where they may:

(A) Store personal clothing not in use.

(B) Put on label-specified personal protective equipment at the start of any exposure period.

(C) Remove label-specified personal protective equipment at the end of any exposure period.

(x) The employer shall not allow or direct any handler to wear home or to take home label-specified personal protective equipment, including long-sleeved shirts, long-legged pants or socks contaminated with pesticides.

(g) Heat-related illness. When the use of personal protective equipment is specified by the labeling of any pesticide for the handling activity, the employer shall assure that no handler is allowed or directed to perform the handling activity unless the appropriate measures are implemented if necessary to prevent heat-related illness.

(6) Employers shall instruct each employee in the proper use of any item of personal protective equipment used. Such instruction shall include, but not be limited to, any special limitations or precautions indicated by the manufacturer.

[Statutory Authority: Chapter 49.17 RCW. 93-07-012 (Order 92-24), § 296-306-060, filed 3/5/93, effective 6/1/93. Statutory Authority: RCW 49.17.040 and 49.17.050. 83-24-013 (Order 83-34), § 296-306-060, filed 11/30/83; Order 75-2, § 296-306-060, filed 1/24/75.]

PART M—FIELD SANITATION

WAC 296-306-330 Decontamination. (1) Requirement. During any pesticide handling activity, the employer shall provide for employees in accordance with this section, a decontamination site for washing off pesticides and pesticide residues.

(2) General conditions.

(a) The employer shall provide employees with enough water for routine washing, for emergency eyeflushing, and for washing the entire body in case of an emergency. At least 10 gallons of water for one employee and 20 gallons of water for two or more employees shall be provided at mixing and loading sites that do not have running water. At all times when the water is available to employees, the employer shall assure that it is of a quality and temperature that will not cause illness or injury when it contacts the skin or eyes or if it is swallowed.

(b) When water stored in a tank is to be used for mixing pesticides, it shall not be used for decontamination or eye flushing, unless the tank is equipped with properly functioning valves or other mechanisms that prevent movement of pesticides into the tank.

(c) The employer shall provide soap and single-use towels at each decontamination site in quantities sufficient to meet handlers' needs.

(d) The employer shall provide one clean change of clothing, such as overalls, at each decontamination site for use in an emergency.

(3) Location. The decontamination site shall be reasonably accessible to and not more than 1/4 mile from each handler during the handling activity.

(a) Exception for mixing sites. For mixing activities, the decontamination site shall be at the mixing site.

(b) Exception for pilots. The decontamination site for a pilot who is applying pesticides aerially shall be in the airplane or at the aircraft's loading site.

(c) Exception for handling pesticides in remote areas. When handling activities are performed more than 1/4 mile from the nearest place of vehicular access:

(i) The soap, single-use towels, clean change of clothing, and water may be at the nearest place of vehicular access.

(ii) The employer may permit employees to use clean water from springs, streams, lakes, or other sources for decontamination at the remote work site, if such water is more accessible than the water at the decontamination site located at the nearest place of vehicular access.

(d) Decontamination site in treated areas. The decontamination site shall not be in an area being treated with pesticides or in an area under a restricted-entry interval, unless:

(i) The decontamination site is in the area where the employee is performing handling activities;

(ii) The soap, single-use towels, and clean change of clothing are in enclosed containers; and

(iii) The water is running tap water or is enclosed in a container.

(iv) A plumbed or portable emergency eyewash capable of delivering at least 1.5 liters (0.4 gals.) of water per minute

for 15 minutes shall be provided at all pesticide mixing and loading stations or decontamination sites.

(4) Emergency eyeflushing. To provide for emergency eyeflushing, the employer shall assure that at least 1 pint of water is immediately available to each employee who is performing tasks for which the pesticide labeling requires protective eyewear. The eyeflush water shall be carried by the employee, or shall be on the vehicle or aircraft the employee is using, or shall be otherwise immediately accessible.

(5) Decontamination after handling activities. At the end of any exposure period, the employer shall provide at the site where employees remove personal protective equipment, soap, clean towels, and a sufficient amount of water so that the employees may wash thoroughly.

(6) All employees shall have access to the emergency washing facilities in pesticide-related emergency situations.

(7) All emergency washing facilities using nonpotable water shall have signs stating water is nonpotable.

(8) Hygiene training and information. Employees handling pesticides or working in fields or areas treated with pesticides in the current growing season shall receive the following instructions on the first day of employment;

(a) Wash hands and face before eating, drinking, or smoking while handling pesticides or working in the pesticide-treated area.

(b) Take a shower immediately after work each day and change into clean clothes.

(c) Wash work clothing daily in soap and hot water and wash separately from other clothing.

[Statutory Authority: Chapter 49.17 RCW. 93-07-012 (Order 92-24), § 296-306-330, filed 3/5/93, effective 6/1/93.]

WAC 296-306-400 Posting requirements. (1) When a pesticide having a reentry interval greater than twenty-four hours is applied to a labor-intensive agricultural crop, the pesticide-treated area shall be posted with warning signs in accordance with the requirements of this section. Sign design may be either the state design as illustrated by figure 1 or the officially adopted sign of the Environmental Protection Agency. (Reference federal regulation 40 CFR 170.120.)

Note: After April 15, 1994, the United States Environmental Protection Agency will require that their sign design must be posted when you use an agricultural pesticide product that has a label requirement for posting as required by the worker/protection standard 40 CFR 170.

(2) Definitions for the purposes of this section are:

(a) "Labor-intensive agricultural crop" means crops requiring substantial hand-labor for planting, thinning, cultivating, pruning, harvesting, or other agricultural activities. Labor-intensive agricultural crops include but are not limited to apples, cherries, peaches, berries, hops, grapes, asparagus, pears, plums, nectarines, onions, cucumbers, cauliflower, and squash. By virtue of mechanization, crops such as, but not limited to, wheat, oat, and barley are excluded unless substantial hand-labor is utilized.

(b) "Reentry interval" means the length of time after an application until personnel will be allowed to reenter a treated area for work purposes without personal protective equipment.

(3) Pesticide warning signs required under this section shall be posted in such a manner as to be clearly visible from all usual points of entry to the pesticide-treated area. If there are no usual points of entry or the area is adjacent to an unfenced public right of way, signs shall be posted:

(a) At each corner of the pesticide-treated area; and

(b) At intervals not exceeding six hundred feet; and/or

(c) At other locations approved by the department that provide maximum visibility.

(4) The signs shall be posted within twenty-four hours before scheduled application of the pesticide, and remain posted during application and throughout the applicable reentry interval. Signs shall be removed within two days after the expiration of the applicable reentry interval and before employee reentry is permitted. Employees working in an area scheduled for a pesticide application shall be informed of the application and shall vacate the area to be sprayed prior to the application of the pesticide.

(5) Signs shall be legible for the duration of use and wording shall be in English and Spanish.

(6) Signs shall meet the following criteria: (Unless EPA signs are used).

(a) The background color shall be white.

(b) The border at least one-half inch in width shall be red.

(c) The words "DANGER" and "PELIGRO" shall be at the top. Letters for these words shall be black and at least two and one-half inches in height.

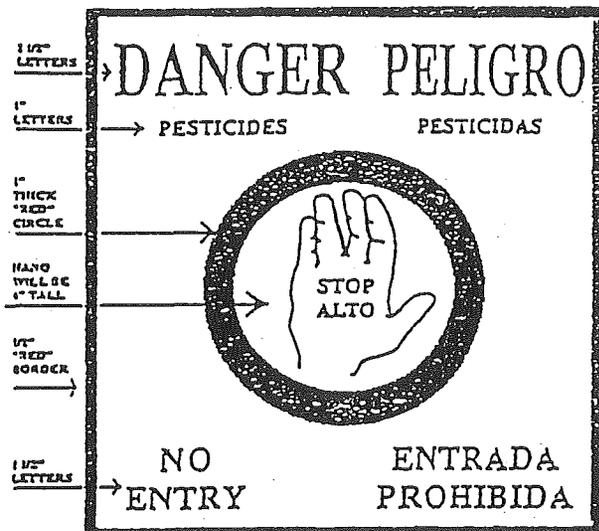
(d) The words "pesticides" and "pesticidas" shall be at the top but below the words "DANGER" and "PELIGRO," respectively. Letters for these words shall be black and at least one inch in height.

(e) The center of the sign shall contain a circle comprised of a one-inch thick red line and contain an upraised hand in black with the white words "STOP" and "ALTO," respectively shown on the palm in the center of the circle. The hand shall be at least six inches in length.

(f) The words "NO ENTRY" and "ENTRADA PROHIBIDA" shall be at the bottom. Letters for these words shall be black and at least one and one-half inches in height.

(g) Sizes of letters and symbols listed are minimum acceptable size posters. Larger posters may be used provided the proportionate size of letters and symbols are maintained.

(7) A small black and white facsimile of the warning sign meeting these requirements is shown in Figure 1.



[Statutory Authority: Chapter 49.17 RCW. 94-06-068 (Order 93-17), § 296-306-400, filed 3/2/94, effective 4/15/94; 93-07-012 (Order 92-24), § 296-306-400, filed 3/5/93, effective 6/1/93; 91-24-017 (Order 91-07), § 296-306-400, filed 11/22/91, effective 12/24/91. Statutory Authority: Chapters 49.17 and 49.70 RCW. 90-11-023 (Order 89-19), § 296-306-400, filed 5/9/90, effective 7/1/90.]

WAC 296-306-40007 Emergency medical care information. (1) The name, address, and telephone number of the nearest emergency medical-care facility shall be posted.

(2) Updating. The agricultural employer shall inform workers promptly of any changes to the information on emergency medical-care facilities.

(3) Location.

(a) The information shall be displayed in a location on the farm or in the nursery or greenhouse where it can be readily seen and read by workers.

(b) The information shall be displayed in a location in or near the forest in a place where it can be readily seen and read by workers and where workers are likely to congregate or pass by, such as a shop or an equipment storage site.

(4) Accessibility. Workers shall be informed of the location of the information and shall be allowed access to it.

(5) Legibility. The information shall remain legible during the time it is posted.

[Statutory Authority: Chapter 49.17 RCW. 93-07-012 (Order 92-24), § 296-306-40007, filed 3/5/93, effective 6/1/93.]

WAC 296-306-40009 Emergency assistance. If there is reason to believe that an employee has been poisoned or injured by pesticides used on the agricultural establishment, including, but not limited to, exposures from application splash, spill, drift and pesticide residues, the agricultural employer shall:

(1) Make available to the worker prompt transportation from the place of employment or the handling site to an appropriate emergency medical facility.

(2) Provide, promptly, upon request, the following information to the employee or to treating medical personnel:

(1997 Ed.)

(a) Product name, EPA registration number, and active ingredients in any product to which the worker might have been exposed during the previous 30 days.

(b) Antidote, first aid, and other medical information from the product labeling.

(c) Information about the circumstances of application or use of the pesticide on the farm, greenhouse, nursery, or forest, and about the exposure of the worker to the pesticide.

[Statutory Authority: Chapter 49.17 RCW. 93-07-012 (Order 92-24), § 296-306-40009, filed 3/5/93, effective 6/1/93.]

Chapter 296-306A WAC

SAFETY STANDARDS FOR AGRICULTURE

Reviser's note: The Department of Labor and Industries plans to change this chapter number from 306A to 307 in 1997.

WAC

FIELD OPERATIONS AND GENERAL REQUIREMENTS

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296-306A-07011	What safety equipment must motor vehicles have?	296-306A-12020	Entry restrictions—Standards for workers—40 CFR, § 170.112.
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296-306A-08018	What employee training requirements apply to ROPS used on agricultural tractors?	296-306A-13015	Providing specific information about applications—Standards for pesticide handlers—40 CFR, § 170.222.
296-306A-08021	What other requirements apply to ROPS used on agricultural tractors?	296-306A-13020	Notice of applications to agricultural employers—Standards for pesticide handlers—40 CFR, § 170.224.
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- 296-306A-205 Guarding portable powered tools.
- 296-306A-20505 What requirements apply to guarding portable powered tools?
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- 296-306A-220 Power lawnmowers.
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- 296-306A-22006 What are the general guarding requirements for power lawnmowers?
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- 296-306A-22012 What rules apply to walk-behind rotary mowers?
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- 296-306A-22506 How shall the rated load be marked on a jack?
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- 296-306A-24003 What does this section cover?
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- 296-306A-24009 What housekeeping requirements apply to fixed, indoor workplaces?
- 296-306A-24012 How must the potable water supply be maintained?
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- 296-306A-24018 What toilet facilities must an employer provide?
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 - 296-306A-25003 What definitions apply to this section?
 - 296-306A-25006 When may railings be omitted?
 - 296-306A-25009 What protection must an employer provide for floor openings?
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 - 296-306A-25015 What protection must an employer provide for open-sided floors, platforms, and runways?
 - 296-306A-25018 What requirements apply to stairway railings and guards?
 - 296-306A-25021 How must a standard railing be constructed?
 - 296-306A-25024 How must a stair railing be constructed?
 - 296-306A-25027 What are the requirements for railing dimensions?
 - 296-306A-25030 What requirements apply to toeboards?
 - 296-306A-25033 How must handrails and railings be constructed?
 - 296-306A-25036 What materials may be used for floor opening covers?
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 - 296-306A-25042 What protection must an employer provide for wall openings?
 - 296-306A-260 Fixed industrial stairs.
 - 296-306A-26003 What does this section cover?
 - 296-306A-26006 What definitions apply to this section?
 - 296-306A-26009 Where are fixed stairs required?
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 - 296-306A-26015 How strong must fixed stairs be?
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 - 296-306A-26024 What requirements apply to stair treads?
 - 296-306A-26027 What requirements apply to the length of stairways?
 - 296-306A-26030 What requirements apply to railings and handrails on fixed stairs?
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 - 296-306A-26036 What other requirements apply to fixed stairs?
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 - 296-306A-27005 What requirements apply to aerial manlift equipment?
 - 296-306A-27010 What requirements apply to using aerial manlift equipment?
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Transmission Machinery
- 296-306A-280 Guarding power transmission machinery.
 - 296-306A-28002 What power transmission belts are covered by this section?

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296-306A-28022	What requirements apply to guarding overhead horizontal belt, rope, and chain drives?	296-306A-32011	What does this section cover?
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296-306A-28030	What requirements apply to guarding gears, sprockets, and chains?	296-306A-32019	How does an employer determine when to use lockout vs. tagout?
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296-306A-28038	Must self-lubricating bearings be used?	296-306A-32027	How often must the energy control procedure be inspected?
296-306A-28040	What requirements apply to guarding clutches, cutoff couplings, and clutch pulleys?	296-306A-32029	What general requirements apply to energy control program training and communication?
296-306A-28042	What requirements apply to guarding belt shifters, clutches, shippers, poles, perches, and fasteners?	296-306A-32031	What additional requirements apply to tagout training and communication?
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296-306A-28046	How must standard guards be manufactured?	296-306A-32035	What training records must an employer keep?
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296-306A-28050	What materials must be used for guards?	296-306A-32039	Who must be notified of lockout and tagout?
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296-306A-28056	What clearance must be maintained between guards and power transmission machinery?		What requirements apply to testing and positioning machines and equipment?
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296-306A-28064	How must pulleys be maintained?		
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296-306A-290	Auger conveying equipment.	296-306A-330	Safety color coding; accident prevention signs and tags.
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		296-306A-34015	What are the requirements for inspection, maintenance and testing of portable fire extinguishers?
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296-306A-34509	What are the installation and restoration requirements for employee alarm systems?	296-306A-36812	What requirements apply to open wiring on insulators?
296-306A-34512	How must employee alarm systems be maintained and tested?	296-306A-36815	What wiring requirements apply to cabinets, boxes, and fittings?
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296-306A-35009	What are the design requirements for exit routes?	296-306A-36830	How must flexible cords and cables be identified, spliced, and terminated?
296-306A-35012	What are the operation and maintenance requirements for exit routes?	296-306A-36833	What requirements apply to multiconductor portable cable?
296-306A-35015	What are the requirements for an emergency action plan?	296-306A-36836	When may fixture wires be used?
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296-306A-360	Electrical.	296-306A-36848	What requirements apply to wiring for motors, motor circuits, and controllers?
296-306A-36005	What does this part cover?	296-306A-36851	What requirements apply to wiring for transformers?
296-306A-36010	What definitions apply to this part?	296-306A-36854	What requirements apply to wiring for capacitors?
296-306A-362	General electrical requirements.	296-306A-36857	How must storage batteries be ventilated?
296-306A-36203	What electrical equipment must be approved?	296-306A-36860	What other miscellaneous requirements apply to wiring methods?
296-306A-36206	How must electrical equipment safety be determined?	296-306A-370	Special purpose equipment and installations.
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296-306A-36218	What protection must be provided against combustible materials?	296-306A-37012	What requirements apply to electrically driven or controlled irrigation machines?
296-306A-36221	How must electrical equipment be marked?	296-306A-372	Hazardous (classified) locations.
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296-306A-36227	What access and working space must be provided for electrical equipment of 600 volts, nominal, or less?	296-306A-37206	What classifications apply to this section?
296-306A-36230	What access and working space must be provided for electrical equipment over 600 volts, nominal?	296-306A-37209	What equipment, wiring methods, and installations may be used in hazardous locations?
296-306A-364	Electrical installation and maintenance.	296-306A-37212	How must conduit be installed in hazardous locations?
296-306A-36403	How must flexible cords and cables be installed and maintained?	296-306A-37215	Which equipment may be used in Division 1 and 2 locations?
296-306A-36406	How must attachment plugs and receptacles be installed and maintained?	296-306A-37218	What requirements apply to motors and generators used in hazardous locations?
296-306A-36409	What must employees do when equipment causes electrical shock?	296-306A-374	Special systems.
296-306A-36412	What grounding and bonding requirements apply to equipment installation and maintenance?	296-306A-37403	What requirements apply to systems over 600 volts, nominal?
296-306A-36415	What requirements apply to disconnecting means?	296-306A-37406	What requirements apply to emergency power systems?
296-306A-36418	What requirements apply to identification and load rating of electrical equipment?	296-306A-37409	How are Class 1, Class 2, and Class 3 remote control, signaling, and power-limited circuits classified?
296-306A-36421	How must equipment be installed in wet locations?	296-306A-37412	What requirements apply to fire protective signaling systems?
296-306A-366	Wiring design and protection.	296-306A-376	Working on or near exposed energized parts.
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296-306A-36606	What ampere rating must outlet devices have?	296-306A-37606	Who may work on energized parts?
296-306A-36609	What requirements apply to conductors?	296-306A-37609	What requirements apply to working near low voltage lines?
296-306A-36612	What design and protection requirements apply to service-entrances?	296-306A-37612	What requirements apply to qualified persons working near overhead lines?
296-306A-36615	What overcurrent protection must be provided?	296-306A-37615	What requirements apply to vehicles and mechanical equipment near overhead lines?
296-306A-36618	What premises wiring systems must be grounded?	296-306A-37618	What lighting must be provided for employees working near exposed energized parts?
296-306A-36621	Must the conductor be grounded for AC premises wiring?	296-306A-37621	What requirements apply to working near exposed energized parts in confined spaces?
296-306A-36624	What general requirements apply to grounding conductors?	296-306A-37624	What housekeeping requirements apply to working near exposed energized parts?
296-306A-36627	Must the path to ground be continuous?	296-306A-37627	Who may defeat an electrical safety interlock?
296-306A-36630	What supports, enclosures, and equipment must be grounded?	296-306A-378	Safety-related work practices.
296-306A-36633	How must fixed equipment be grounded?	296-306A-37801	What does this section cover?
296-306A-36636	How must high voltage systems be grounded?		
296-306A-368	Wiring methods, components, and equipment for general use.		
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296-306A-36806	What wiring methods must be used for temporary wiring?		
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296-306A-37803	How must employees be trained on safety practices?	296-306A-40039	What requirements apply to electrical equipment and wiring?
296-306A-37805	How must safety-related work practices be chosen and used?		Part U-2
296-306A-37807	What work practices must be followed for work on exposed deenergized parts?		Hazardous Materials—Liquified Petroleum Gas
296-306A-37809	Must an employer have a written copy of lockout-tagout procedures?	296-306A-410	Storage and handling of liquefied petroleum gases. What does this part cover?
296-306A-37811	What work practices must be followed for deenergizing equipment?	296-306A-41001	Which LP-gas installations are not covered by this part?
296-306A-37813	How must locks and tags be applied?	296-306A-41005	What definitions apply to this part?
296-306A-37815	What work practices must be followed to verify deenergization?	296-306A-41007	When must LP-gas be odorized?
296-306A-37817	What work practices must be followed when reenergizing equipment?	296-306A-41009	Must LP-gas containers and equipment be approved?
296-306A-37819	What safety-related work practices relate to portable electric equipment?	296-306A-41011	What construction and test requirements must containers meet?
296-306A-37821	What safety-related work practices relate to electric power and lighting circuits?	296-306A-41013	How must containers be welded?
296-306A-37823	What safety-related work practices relate to test instruments and equipment?	296-306A-41015	How must containers be marked?
296-306A-37825	What safety-related work practices relate to flammable materials?	296-306A-41017	Where must containers be located?
296-306A-380	Electrical protective equipment.	296-306A-41019	What requirements apply to valves and accessories?
296-306A-38003	How must protective equipment be used?	296-306A-41021	What requirements apply to piping, tubing, and fittings?
296-306A-38006	What requirements apply to general protective equipment and tools?	296-306A-41023	What specifications must hoses meet?
296-306A-38009	What manufacturing and marking requirements apply to electrical protective devices?	296-306A-41025	What requirements apply to safety devices?
296-306A-38012	What electrical requirements apply to electrical protective devices?	296-306A-41027	How must indirect fired vaporizers be constructed and installed?
296-306A-38015	What workmanship and finish requirements apply to electrical protective devices?	296-306A-41029	How must atmospheric vaporizers be constructed and installed?
296-306A-38018	How must electrical protective devices be maintained and used?	296-306A-41031	How must direct gas-fired vaporizers be constructed and installed?
	SPECIALIZED OPERATIONS	296-306A-41033	How must direct gas-fired tank heaters be constructed and installed?
	Part U-1	296-306A-41035	How must dehydrators be constructed and installed?
	Hazardous Materials—Anhydrous Ammonia	296-306A-41037	What are the maximum filling densities?
296-306A-400	Anhydrous ammonia.	296-306A-41039	What requirements apply to LP-gas in buildings?
296-306A-40001	What does this section cover?	296-306A-41041	What requirements apply to transfer of liquids?
296-306A-40003	What definitions apply to this section?	296-306A-41043	Must workers be trained?
296-306A-40005	What general requirements apply to the storage and handling of anhydrous ammonia?	296-306A-41045	What fire protection must be provided for LP-gas installations?
296-306A-40007	What requirements apply to systems mounted on farm wagons (implements of husbandry) for the transportation of ammonia?	296-306A-41047	What electrical requirements apply to LP-gas installations?
296-306A-40009	What requirements apply to systems mounted on farm wagons (implements of husbandry) for the application of ammonia?	296-306A-41049	What requirements apply to liquid-level gauging devices?
296-306A-40011	What requirements must approved anhydrous ammonia equipment meet?	296-306A-41051	What requirements apply to appliances?
296-306A-40013	What requirements apply to the construction, original test, and requalification of nonrefrigerated containers?	296-306A-415	Cylinder systems.
296-306A-40015	How must nonrefrigerated containers and systems (other than DOT containers) be marked?	296-306A-41501	What does this section cover?
296-306A-40017	Where may anhydrous ammonia containers be located?	296-306A-41503	What is a "cylinder system?"
296-306A-40019	What requirements apply to container accessories?	296-306A-41505	How must containers be marked for cylinder systems?
296-306A-40021	What requirements apply to piping, tubing, and fittings?	296-306A-41507	What additional requirements apply to cylinder systems installed outdoors?
296-306A-40023	What specifications must hoses meet?	296-306A-41509	What additional requirements apply to cylinder system installed indoors?
296-306A-40025	What requirements apply to safety-relief devices?	296-306A-41511	What requirements apply to valves and accessories?
296-306A-40027	What emergency precautions are required when handling anhydrous ammonia?	296-306A-41513	What requirements apply to safety devices for cylinder systems?
296-306A-40029	What requirements apply to filling densities?	296-306A-41515	What other requirements apply to cylinder systems?
296-306A-40031	What requirements apply to the transfer of liquids?	296-306A-420	Systems using non-DOT containers.
296-306A-40033	What requirements apply to tank car unloading points and operations?	296-306A-42001	What does this section cover?
296-306A-40035	What requirements apply to the liquid-level gauging device?	296-306A-42003	How must non-DOT containers be designed and classified?
296-306A-40037	How should aboveground uninsulated containers be maintained?	296-306A-42005	What requirements apply to valves and accessories, filler pipes, and discharge pipes for non-DOT containers?
		296-306A-42007	What additional requirements apply to safety devices for non-DOT containers?
		296-306A-42009	When may non-DOT containers be reinstalled?
		296-306A-42011	What is the maximum capacity allowed for non-DOT containers?
		296-306A-42013	How must non-DOT containers be installed?
		296-306A-42015	How must non-DOT containers be protected?
		296-306A-42017	What requirements apply to non-DOT containers in industrial plants?

296-306A-42019	What requirements apply to container-charging plants?	296-306A-44013	What equipment must be protected against tampering?
296-306A-42021	What fire protection must be provided for non-DOT containers?	296-306A-44015	What requirements apply to the transport truck unloading point?
296-306A-42023	What other requirements apply to non-DOT containers?	296-306A-44017	What requirements apply to piping, valves, and fittings?
296-306A-425	LP-gas as a motor fuel.	296-306A-44019	What requirements apply to pumps and accessory equipment?
296-306A-42501	What does this section cover?	296-306A-44021	What requirements apply to LP-gas dispensing devices?
296-306A-42503	What general requirements apply to LP-gas used as a motor fuel?	296-306A-44023	Is smoking allowed at LP-gas service stations?
296-306A-42505	How must fuel containers be designed and classified?	296-306A-44025	What fire protection must be provided at LP-gas service stations?
296-306A-42507	How must fuel containers be installed?		
296-306A-42509	What requirements apply to valves and accessories?		
296-306A-42511	What requirements apply to piping, tubing, and fittings?		
296-306A-42513	What requirements apply to safety devices?	296-306A-450	Part U3
296-306A-42515	What requirements apply to vaporizers?	296-306A-45001	Other Hazardous Materials
296-306A-42517	What requirements apply to gas regulating and mixing equipment?	296-306A-45003	Other hazardous materials.
296-306A-42519	What is the maximum container capacity allowed?	296-306A-45005	What general requirements apply to hazardous materials and flammable and combustible liquids?
296-306A-42521	What requirements apply to stationary engines used indoors?	296-306A-45007	What requirements apply to dip tanks containing flammable or combustible liquids?
296-306A-42523	What requirements apply to portable engines used indoors?	296-306A-45009	What definitions apply to this section?
296-306A-42525	What requirements apply to industrial trucks used indoors?	296-306A-45011	What requirements must ventilation systems meet?
296-306A-42527	How must LP-gas-fueled vehicles be garaged?	296-306A-45013	What general requirements apply to the construction of dip tanks?
296-306A-430	Storage of containers awaiting use or resale.	296-306A-45015	How must overflow pipes for dip tanks be constructed?
296-306A-43001	What does this section cover?	296-306A-45017	How must the bottom drains of dip tanks be constructed?
296-306A-43003	What general requirements apply to storage of containers?	296-306A-45019	How must liquids used in dip tanks be stored and handled?
296-306A-43005	How must containers be stored within buildings frequented by the public?	296-306A-45021	What measures must an employer take to prevent hazards from electrical and other ignition sources?
296-306A-43007	How must containers be stored in buildings not frequented by the public?	296-306A-45023	How must dip tanks be operated and maintained?
296-306A-43009	How must containers be stored within special buildings or rooms?	296-306A-45025	What requirements must fire extinguishing systems meet?
296-306A-43011	How must containers be stored outdoors?	296-306A-45027	What requirements apply to hardening and tempering tanks?
296-306A-43013	What fire protection must be provided for stored containers?	296-306A-45029	What requirements apply to flow coat applications?
296-306A-435	LP-gas system installations on commercial vehicles.		What requirements apply to electrostatic apparatus?
296-306A-43501	What does this section cover?		What requirements apply to roll coating applications?
296-306A-43503	How must containers be constructed?		
296-306A-43505	What is the maximum capacity allowed for LP-gas installations on commercial vehicles?	296-306A-475	Part V
296-306A-43507	Where must systems be located?	296-306A-47501	Welding
296-306A-43509	What requirements apply to valves and accessories?	296-306A-480	Welding, cutting, and brazing.
296-306A-43511	What requirements apply to safety devices?	296-306A-48001	What definitions apply to this part?
296-306A-43513	What types of systems may be used on commercial vehicles?	296-306A-48003	Installation and operation of oxygen fuel gas systems for welding and cutting.
296-306A-43515	What requirements apply to enclosures and mounting?	296-306A-48005	What general requirements apply to oxygen fuel gas systems?
296-306A-43517	What requirements apply to piping, tubing, and fittings?	296-306A-48007	What requirements apply to portable cylinders?
296-306A-43519	What requirements apply to appliances?	296-306A-48009	What general requirements apply to storing compressed gas cylinders?
296-306A-43521	What general precautions must be followed for LP-gas system installations on commercial vehicles?	296-306A-48011	How must fuel-gas cylinders be stored?
296-306A-43523	How must containers be charged?	296-306A-48013	How must oxygen cylinders be stored?
296-306A-43525	What fire protection must be provided for mobile cook units?	296-306A-48015	What general operating procedures apply to working with cylinders and containers?
296-306A-440	LP-gas service stations.	296-306A-48017	What requirements apply to safety devices on cylinders?
296-306A-44001	What does this section cover?	296-306A-48019	How must cylinders be transported?
296-306A-44003	How must storage containers be designed and classified?	296-306A-48021	How must cylinders be handled?
296-306A-44005	What requirements apply to valves and accessories?	296-306A-48023	What requirements apply to cylinder valves?
296-306A-44007	What requirements apply to safety devices?	296-306A-48025	What requirements apply to cylinder regulators?
296-306A-44009	What is the maximum capacity allowed for containers?	296-306A-48027	What requirements apply to fuel-gas manifolds?
296-306A-44011	How must storage containers be installed?	296-306A-48029	What requirements apply to high pressure oxygen manifolds?
			What requirements apply to low pressure oxygen manifolds?
			What requirements apply to manifolding portable outlet headers?

296-306A-48031	What operating procedures apply to cylinder manifolds?		
296-306A-48033	How must service piping systems be designed?		
296-306A-48035	What requirements apply to piping joints?	296-306A-520	Powered industrial trucks (forklifts).
296-306A-48037	How must service piping systems be installed?	296-306A-52001	What does this section cover?
296-306A-48039	How must service piping systems be painted and marked?	296-306A-52003	What is a "powered industrial truck"?
296-306A-48041	How must service piping systems be tested?	296-306A-52005	What manufacturer's requirements apply to powered industrial trucks?
296-306A-48043	How must equipment be installed?	296-306A-52007	What are the classifications of powered industrial trucks?
296-306A-48045	How must service piping systems be protected?	296-306A-52009	What must a user consider before choosing a powered industrial truck?
296-306A-48047	What requirements apply to piping protective equipment?	296-306A-52011	What requirements determine which trucks to use in specific hazardous environments?
296-306A-48049	What requirements apply to station outlet protective equipment?	296-306A-52013	In what environments may converted trucks be used?
296-306A-48051	What requirements apply to hose and hose connections?	296-306A-52015	What requirements apply to overhead safety guards?
296-306A-48053	What requirements apply to pressure-reducing regulators?	296-306A-52017	What requirements apply to load backrests?
296-306A-485	Installation and operation of resistance welding equipment.	296-306A-52019	What requirements apply to fuel handling and storage?
296-306A-48501	What general requirements apply to resistance welding equipment?	296-306A-52021	What requirements apply to lighting for operating areas?
296-306A-48503	What requirements apply to portable welding machines?	296-306A-52023	What level of carbon monoxide gas is allowed?
296-306A-48505	What requirements apply to flash welding equipment?	296-306A-52025	What requirements apply to dockboards (bridge plates)?
296-306A-48507	Who must perform a job hazard analysis?	296-306A-52027	What rules apply to loading trucks, trailers, and railroad cars with powered industrial trucks?
296-306A-48509	What maintenance requirements apply to resistance welding equipment?	296-306A-52029	Who may operate powered industrial trucks?
296-306A-490	Application, installation, and operation of arc welding and cutting equipment.	296-306A-52031	What requirements apply to operating powered industrial trucks?
296-306A-49001	What environmental conditions must be taken into account when selecting arc welding equipment?	296-306A-52033	When may trucks be used to open or close freight car doors?
296-306A-49003	What voltages must arc welding equipment use?	296-306A-52035	What requirements apply to lifting employees on the forks of trucks?
296-306A-49005	How must arc welding equipment be designed?	296-306A-52037	What requirements apply to using platforms for hoisting employees?
296-306A-49007	How must arc welding equipment be installed?	296-306A-52039	What requirements apply to traveling in a powered industrial truck?
296-306A-49009	How must arc welding equipment be grounded?	296-306A-52041	What requirements apply to traveling speeds of powered industrial trucks?
296-306A-49011	What requirements apply to supply connections and conductors?	296-306A-52043	What requirements apply to loading powered industrial trucks?
296-306A-49013	How must arc welding equipment be operated?	296-306A-52045	What requirements apply to servicing powered industrial trucks?
296-306A-49015	How must arc welding equipment be maintained?	296-306A-52047	What requirements apply to maintaining powered industrial trucks?
296-306A-495	Fire prevention and protection.		
296-306A-49501	What basic fire prevention precautions must be taken?		
296-306A-49503	What special fire prevention precautions must be taken?		
296-306A-49505	What precautions must be taken when welding or cutting containers?		
296-306A-49507	What precautions must be taken when welding in confined spaces?		
296-306A-500	Protection of employees.		
296-306A-50001	How must eye protection be selected?	296-306A-530	Rim wheel servicing.
296-306A-50003	What specifications must eye protection meet?	296-306A-53001	What does this section cover?
296-306A-50005	What protective clothing must welders wear?	296-306A-53003	What definitions apply to rim wheel servicing?
296-306A-50007	What other requirements apply to employee protection?	296-306A-53005	What training must an employer provide for employees who service rim wheels?
296-306A-50009	What employee protection must be provided in confined spaces?	296-306A-53007	What requirements apply to restraining devices?
296-306A-50011	What general requirements apply to welding ventilation?	296-306A-53009	What other equipment must an employer provide for rim wheel servicing?
296-306A-50013	What ventilation must be provided for general welding and cutting?	296-306A-53011	What requirements apply to wheel component assembly?
296-306A-50015	What requirements apply to local exhaust hoods and booths?	296-306A-53013	What are the safe operating procedures for servicing multipiece rim wheels?
296-306A-50017	What ventilation must be provided in confined spaces?	296-306A-53015	What are the safe operating procedures for servicing single-piece rim wheels?
296-306A-50019	What requirements apply to welding fluorine compounds?	296-306A-53017	How can an employer order the OSHA charts?
296-306A-50021	What requirements apply to welding zinc?		
296-306A-50023	What requirements apply to welding lead?		
296-306A-50025	What requirements apply to welding beryllium?		
296-306A-50027	What requirements apply to welding cadmium?		
296-306A-50029	What requirements apply to welding mercury?		

FIELD OPERATIONS AND GENERAL REQUIREMENTS

Part A

General and Educational Requirements

WAC 296-306A-003 How is this chapter divided?

The first three digits of the WAC (296) are the title. The second three digits are the chapter (306A). The third number group is the section, which may have three or five digits. The fourth and fifth digits are treated as if there were a decimal point after the third digit.

For example: Section 330 of this chapter includes all five-digit sections whose number begins with 330.

Sections may be further divided as indicated below.

Title-Chapter-Section 296-306A-330

296-306A-33003

Subsection (1)

(2)

Subdivision (a)

(b)

Item (i)

(ii)

Note: The chapter is also divided into "parts" according to subject, to make it easier for you to find the information you need.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-003, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-006 What does this chapter cover?

(1) Chapter 296-306A WAC applies to all agricultural operations with one or more employees covered by the Washington Industrial Safety and Health Act (WISHA), chapter 49.17 RCW.

"Agricultural operations" are all operations necessary to farming and ranching, including equipment and machinery maintenance, and planting, cultivating, growing or raising, keeping for sale, harvesting, or transporting on the farm or to the first place of processing any tree, plant, fruit, vegetable, animal, fowl, fish, or insects or products. Agricultural operations include all employers in one or more of the following standard industrial classification (SIC) codes:

- 0111 Wheat
- 0115 Corn
- 0119 Cash grains not elsewhere classified, barley, peas, lentils, oats, etc.
- 0133 Sugar cane and sugar beets
- 0134 Irish potatoes—all potatoes except yams
- 0139 Field crops—hay, hops, mint, etc.
- 0161 Vegetables and melons, all inclusive
- 0171 All berry crops
- 0172 Grapes
- 0173 Tree nuts
- 0175 Deciduous tree fruits
- 0179 Tree fruits or tree nuts not elsewhere classified
- 0181 Ornamental floriculture and nursery products
- 0182 Food crops grown under cover
- 0191 General farms, primarily crops
- 0211 Beef cattle feedlots
- 0212 Beef cattle except feedlots—cattle ranches

- 0213 Hogs
- 0214 Sheep and goats
- 0219 General livestock except dairy and poultry
- 0241 Dairy farms
- 0251 Broiler, fryer, and roaster chickens
- 0252 Chicken eggs
- 0253 Turkeys and turkey eggs
- 0254 Poultry hatcheries
- 0259 Poultry and eggs not elsewhere classified
- 0271 Fur bearing animals and rabbits
- 0272 Horses
- 0273 Animal aquaculture
- 0279 Animal specialties not elsewhere classified
- 0291 General farms, primarily livestock and animal specialties
- 0711 Soil preparation services
- 0721 Crop planting, cultivating, and protecting
- 0722 Crop harvesting, primarily by machine
- 0751 Livestock services, except veterinary
- 0761 Farm labor contractors
- 0811 Timber tracts, Christmas tree growing, tree farms
- 0831 Forest nurseries
- 0851 Forestry services—reforestation

"In-field" processing operations directly related to agricultural operations are covered under this chapter.

(2) If rules in this chapter conflict with rules in another chapter of Title 296 WAC, this chapter prevails.

(3) When you assign employees to perform tasks other than those directly related to agricultural operations, the proper chapter of Title 296 WAC applies instead of this chapter.

For example: Employees working in fruit and vegetable packing houses are covered by the general safety and health standards in chapter 296-24 WAC. Employees working on logging and sawmill activities are covered by the appropriate chapter of Title 296 WAC.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-006, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-009 What definitions apply to this chapter?

"Approved" means approved by the director of the department of labor and industries, or by another organization designated by the department. Also means listed or approved by a nationally recognized testing laboratory.

"Authorized person" means someone you have approved to perform specific duties or to be at a specific location on the job site.

"Department" means the department of labor and industries. When this chapter refers to "we" or "us," it means the department.

"Director" means the director of the department of labor and industries, or a designated representative.

"Employee" means someone providing personal labor in the business of the employer, including anyone providing personal labor under an independent contract.

"Employer" means a business entity having one or more employees. Also, any person, partnership, or business entity with no employees but having industrial insurance coverage is both an employer and an employee. When this chapter

refers to "you," it means the employer or a designated representative.

"Hazard" means a condition that can cause injury, death, or occupational disease.

"Listed" means listed by a nationally recognized testing laboratory.

"Must" means mandatory.

"Nationally recognized testing laboratory" See 29 CFR 1910.7 (federal OSHA requirements).

"Pesticide" means:

- Any substance intended to prevent, destroy, control, repel, or mitigate any insect, rodent, snail, slug, fungus, weed, and any other form of plant or animal life or virus, except virus on or in a living person or other animal which is normally considered to be a pest or which the director may declare to be a pest;

- Any substance or mixture of substances intended to be used as a plant regulator, defoliant or desiccant; and

- Any spray adjuvant, such as a wetting agent, spreading agent, deposit builder, adhesive, emulsifying agent, deflocculating agent, water modifier, or similar agent with or without toxic properties of its own, intended to be used with any pesticide as an aid to its application or effect, and sold in a package or container separate from that of the pesticide with which it is to be used.

"Safety factor" means the ratio of the ultimate breaking strength of a piece of material or equipment to the actual working stress or safe load when in use.

"Should" or "may" means recommended.

"Standard safeguard" means a device designed and constructed to remove a hazard related to the machine, appliance, tool, building, or equipment to which it is attached.

"Working day," for appeals and accident reporting, means a calendar day, except Saturdays, Sundays, and legal holidays as defined by RCW 1.16.050. To compute the time within which an act is to be completed, exclude the first working day and include the last.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-009, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-012 What does it mean when equipment is approved by a nonstate organization? Whenever the department requires that you have equipment or processes approved by an organization such as the Underwriters Laboratories (UL), the Bureau of Mines (MSHA), or the National Institute for Occupational Safety and Health (NIOSH), the approval of that organization is considered evidence of your compliance.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-012, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-015 What must an employer do if a serious injury occurs? (1) You must report to us within eight hours of an incident that:

- Causes a fatal or possibly fatal injury;
- Involves acute injury or illness from exposure to pesticides; or
- Causes injury requiring in-patient hospitalization of any employee.

You may phone us or report in person, or you may use the OSHA toll-free central telephone number, 1-800-321-6742.

Exception: If you do not learn of a reportable incident when it happens, you must report it within eight hours of learning about the incident.

(a) Your report must include:

- Establishment name;
- Location of the incident;
- Time of the incident;
- Number of fatalities, hospitalized employees, or pesticide exposures;
- Contact person;
- Phone number; and
- Brief description of the incident.

(b) Fatalities or hospitalizations that occur within thirty days of an incident must also be reported.

(2) If a department investigator asks for assistance, you must assign the employees that the investigator requests.

(3) Do not move any equipment involved in the incident until we complete an investigation.

Exception: You may move equipment to prevent additional incidents, or to remove the victim.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-015, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-018 What are the employer's responsibilities? You must:

(1) Provide a safe and healthful working environment.

(2) Ensure that employees do not use defective or unsafe tools and equipment, including tools and equipment that may be furnished by the employee.

(3) Implement a written accident prevention program as required by these standards.

(4) Implement a hazard communication program as required by chapter 296-62 WAC, Part C.

(5) Establish a system for reporting and recording accidents on the OSHA 200 log. (See chapter 296-27 WAC.)

(6) Provide safety education and training programs.

(7) Implement the requirements of WAC 296-62-074 through 296-62-07451 to ensure the safety of employees who are exposed to cadmium in the workplace.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-018, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-021 What are the employee's responsibilities? (1) Employees must cooperate with you and other employees in efforts to eliminate accidents.

(2) Employees must be informed of and observe all safe practices.

(3) Employees must notify you of unsafe conditions of equipment or workplaces.

(4) Employees must use all required safety devices and protective equipment.

(5) Employees must not willfully damage personal protective equipment.

(6) Each employee must promptly report any job-related injury or illness to his or her immediate supervisor, regardless of the degree of severity.

(7) Employees must not engage in any activity unrelated to work that may cause injury to other employees during the course of performing work assignments.

(8) Employees must attend any required training and/or orientation programs designed to increase their competency in occupational safety and health.

(9) Employees must not report to work under the influence of alcohol or controlled substances. Alcohol or controlled substances must not be brought on the worksite.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-021, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-024 How does an employer apply for a variance? (1) If you find that it is impractical for you to comply with specific requirements of this standard, we may permit a variation from the requirements. However, you must still provide equal protection by substitute means and comply with the requirements of chapter 49.17 RCW and chapter 296-350 WAC, variances.

(2) On the variance application you must certify that you have posted a copy of the written application in a place reasonably accessible to your employees. You must also mail a copy of the application to any authorized employee representative. The notice must advise employees of their right to request us to conduct a hearing on the variance application. You must notify employees before you apply.

Note: To request a permanent or temporary variance, you may write to: Department of Labor and Industries, Consultation and Compliance Services, PO Box 44620, Olympia, WA 98504-4620. We will mail you an application form and instruction sheet. We will also send a copy of chapter 296-350 WAC, Variances, if you request it.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-024, filed 10/31/96, effective 12/1/96.]

Part B Accident Prevention Program; First-aid Requirements; Safe Place Standard

WAC 296-306A-030 What are the required elements of an accident prevention program? (1) You must instruct all employees in safe working practices at the beginning of employment. Your instruction must be tailored to the types of hazards to which employees are exposed.

(2) You must develop an accident prevention program tailored to the needs of your agricultural operation and to the types of hazards involved.

(3) Your accident prevention program must contain at least the following elements:

(a) How, when, and where to report injuries and illnesses, and the location of first-aid facilities.

(b) How to report unsafe conditions and practices.

(c) The use and care of personal protective equipment.

(d) What to do in emergencies.

(e) Identification of hazardous chemicals or materials and the instruction for their safe use.

(f) An on-the-job review of the practices necessary to perform job assignments in a safe and healthful manner.

(4) Your accident prevention program must be outlined in writing.

(5) At least once a month, you must conduct a walk-around safety inspection of active job sites, the materials and equipment involved, and operating procedures. A representative chosen by employees must be invited and allowed to accompany you.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-030, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-033 How often must safety meetings be held? (1) Foreman-crew safety meetings must be held at least monthly or whenever there are significant changes in job assignments. These meetings must be tailored to the particular operation or activity occurring at the time.

(2) The meeting minutes must document subjects discussed and attendance.

(3) Short-term operations that last less than one month, such as harvesting, do not require foreman-crew safety meetings but only require initial safety orientation for the operations.

(4) You must maintain copies of the minutes of each foreman-crew safety meeting at the location where the majority of employees report to work each day.

(5) You must retain minutes of foreman-crew safety meetings for one year and be able to show us copies if we ask to see them.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-033, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-036 What items go on the safety bulletin board? (1) You must provide a bulletin board or posting area large enough to display the required safety and health poster, "Job Safety and Health Protection" (F416-081-000), and other safety education material.

(2) The bulletin board must be readily visible in a place where employees gather during some part of the work day. (For example, at the entrance to a field, a parking area, or in a farm building.)

(3) If for any reason any employee is unable to read the notices posted on the bulletin board, you must ensure that the message of the required poster explaining employee rights is communicated to the employee in terms he or she understands. This same requirement applies to variance applications, denials or grants, and to any other notice affecting the employee's rights under WISHA.

(4) Posting must be in the employees' language.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-036, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-039 How many people at the worksite must be first-aid trained? (1) During working hours, each farm or crew must have at least one person qualified to give first-aid.

"Qualified" means that the person holds a current certificate of first-aid training from the American Red Cross or another course with equivalent content and hours.

"Current certificate" means a first-aid training certificate that has not expired.

Note: The local department of labor and industries service location has a list of first-aid courses.

(2) The above requirement is met if the farm operator or spouse holds a current first-aid certificate and is available during working hours.

(3) Exception: The above requirements do not apply to employees whose duties require them to work alone at isolated work stations. However, employees working alone must be checked at intervals by some method agreed upon by you and the employee.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-039, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-042 Must an employer provide first-aid kits? (1) You must furnish first-aid kits as required by this section.

(2) First-aid supplies must be readily accessible and provided for employees working alone at isolated stations.

(3) First-aid kit sizes and numbers are determined by the number of employees normally dependent upon each kit as outlined in the following table:

Number of employees normally assigned to worksite	Minimum first-aid supplies required at worksite
1-15 employees	1 ten-package kit
16-30 employees	2 ten-package kits or 1 24-package kit
31-50 employees	3 ten-package kits or 1 36-package kit
Over 50 employees (Within 1/2 mile radius of supplies)	First-aid Station or 1 36-package kit plus stretcher and 2 blankets

Note: Kits may be carried in any motor vehicle that is used near the crew. The vehicle may be considered a first-aid station when it is identified as one and when the driver is trained in first aid.

- (4) First-aid kits must have at least the following items:
- 1 package 1-inch adhesive bandages (16 per package)
 - 2 packages 4-inch bandage compress (1 per package)
 - 1 package scissors and tweezers (1 each per package)
 - 2 packages 40-inch triangular bandage (1 per package)
 - 1 package antiseptic soap or pads (3 per package)
 - 2 packages eye dressing (1 per package)
 - 1 package 24" x 72" absorbent gauze (1 per package)

Note: You may add items to first-aid kits.

(5) Items used from first-aid kits must be replaced before the next shift. Kits must be checked at least weekly for unauthorized removal of items.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-042, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-045 What are the requirements of the safe place standard? (1) You must furnish to each employee a place of employment free from recognized controllable hazards likely to cause serious injury or death.

(2) You must furnish and require employees to use any safety devices and safeguards that are needed to control recognized hazards. All agricultural methods, operations, and processes must be designed to promote the safety and health of employees.

(3) You must not require an employee to engage in any duty or enter any place that is not safe.

(4) The following are prohibited:

(a) Removing, displacing, damaging, destroying or carrying off any safety device, safeguard, notice or warning intended for use in any place of employment.

(b) Interfering in any way with the use of any safety device, method or process adopted for the protection of any employee.

(5) Intoxicating beverages or narcotics in or around worksites. Employees under the influence of alcohol or narcotics are prohibited from the worksite.

Exception: This rule does not apply to anyone taking prescription drugs and/or narcotics as directed by a physician providing such use does not endanger the employee or others.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-045, filed 10/31/96, effective 12/1/96.]

**Part C
Hand Tools**

WAC 296-306A-050 What requirements apply to hand tools? (1) Using hoes with handles less than four feet long or any hand tool used for weeding or thinning crops in a stooped position, is prohibited.

(2) You must ensure that hand tools are in good condition. Using defective hand tools is prohibited.

(3) You must ensure that hand tools are stored safely when not in use.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-050, filed 10/31/96, effective 12/1/96.]

**Part D
Ladders, Bulk Storage,
Pits, and Trenches**

WAC 296-306A-055 Ladders.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-055, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-05501 How must ladders be cared for and maintained? (1) Ladders must be checked for defects before use, and thoroughly inspected periodically. Ladders shall be inspected immediately in the following situations:

(a) If a ladder tips over, inspect for side rails dents or bends, or excessively dented rungs; check all rung-to-side-rail connections; check hardware connections; check rivets for shear.

(b) If a ladder is exposed to excessive heat, inspect visually for damage and test for deflection and strength characteristics. If you are unsure about the ladder's condition, seek help from the manufacturer.

(2) Ladders must be maintained in good condition at all times. Joints between steps and side rails must be tight. All hardware and fittings must be securely attached, and the moveable parts must operate freely without binding or with too much play.

(3) Defective ladders must be withdrawn from service for repair or destruction and tagged as "Dangerous—Do not use."

(4) Ladders with broken or missing steps, rungs, or cleats, broken side rails, or other faulty equipment must not be used; improvised repairs must not be made.

(5) Ladders must be handled with care. Avoid unnecessary dropping, jarring, or misuse.

(6) Ladder storage must:

(a) Protect the ladder when not in use;

(b) Provide sufficient support to prevent excessive sagging;

(c) Provide ease of access or inspection; and

(d) Prevent danger of accidents when withdrawing a ladder for use.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-05501, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-05503 How must an employer instruct employees to use ladders? (1) At the beginning of employment, you must provide employees with orientation and training on the proper use of ladders, including how to set a ladder and properly dismount with a full load.

(2) To prevent ladder upset, you must instruct employees to avoid overreaching while standing on the ladder.

(3) You must instruct employees that before climbing ladders; rungs, shoes, and boots must be clean of substances that would make them hazardous.

(4) Employees must not climb up or down ladders while carrying tools or materials that interfere with the free use of both hands.

(5) Ladders must not be placed on boxes, barrels, or other unstable bases to obtain additional height.

(6) Stepladders must not be used as single ladders.

(7) When working from a ladder over twenty-five feet from the ground or floor, the ladder must be secured at both top and bottom. When work on a ladder over twenty-five feet from the ground or floor requires the use of both hands, a safety belt must be worn and the safety lanyard secured to the ladder.

(8) Portable ladders must be placed so that the side rails have a secure footing. The top rest for portable rung and cleat ladders must be reasonably rigid and strong enough to support the applied load. The top of the ladder must be placed with the two rails supported, unless equipped with a single support attachment. Such an attachment should be substantial and large enough to support the ladder under load.

(9) Ladders carried on vehicles should be adequately supported to avoid sagging and securely fastened in position to minimize chafing and the effects of road shocks.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-05503, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-05505 How must orchard ladders be used? (1) Orchard ladders longer than sixteen feet are prohibited.

(2) Employers must instruct employees to not stand on the top two steps (the top cap and the next step down) of orchard ladders.

(3) Employers must instruct employees to not step off the ladder onto branches of trees except onto the main crotch.

(4) Standing on the top two steps of the orchard ladder is prohibited.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-05505, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-05507 What other requirements apply to ladders? (1) Ladders made by fastening cleats across a single rail are prohibited.

(2) Wood ladders, when not in use, should be stored where they will not be exposed to the elements, but where there is good ventilation. They must be stored away from radiators, stoves, steam pipes, or other excessive heat or dampness.

(3) Wooden ladders should be kept coated with a suitable protective material. Painted ladders are acceptable if the ladders are carefully inspected prior to painting by competent and experienced inspectors acting for, and responsible to, the purchaser, and if the ladders are not for resale.

(4) A ladder must have feet that are appropriate for the surface on which it will be used.

For example: A ladder used on a slippery surface must have steel points or other nonslip material on its feet.

(5) Ladders must not be placed in front of doors opening toward the ladder unless the door is blocked open, locked, or guarded.

(6) Ladder safety devices may be used on tower, water tank and chimney ladders over twenty feet long in place of cage protection. No landing platform is required in these cases. All ladder safety devices such as lifelines, friction brakes, and sliding attachments must meet the design requirements of the ladders that they serve.

(7) See chapter 296-306A WAC Part K for requirements related to working near overhead lines.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-05507, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-060 What requirements apply to job-made ladders? A "job-made ladder" is a ladder that you or your employees build.

Job-made ladders must meet the following requirements:

(1) All cleats must be made of one-by-four-inch nominal lumber, or stronger.

(2) Cleats must be inset into the edges of side rails to a depth of one-half inch, or filler blocks must be used on the rails between the cleats.

(3) Each cleat must be fastened to each rail with three 8d common wire nails or other fasteners of equal strength.

(4) Cleats must be uniformly spaced approximately 12 inches from the top of one cleat to the top of the next.

(5) Side rails must be continuous, unless splices develop the full strength of a continuous rail of equal length.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-060, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-061 What requirements apply to working around bins, bunkers, hoppers, tanks, pits, and trenches? (1) Employees must be prohibited from entering any bin, bunker, hopper, or similar area when loose materials (such as chips, sand, grain, gravel, sawdust, etc.) may collapse, unless the employee wears a safety belt with a lifeline attached and is attended by a helper.

Note: Silage pits are exempt from this section.

(2) When employees are required to work in a trench or a pit 4 feet deep or more, the trench or the pit must be shored or sloped according to the following table:

SOIL OR ROCK TYPE	MAXIMUM ALLOWABLE SLOPES (H:V) (1) FOR EXCAVATIONS LESS THAN 20 FEET DEEP (2)
STABLE ROCK	VERTICAL (90°)
TYPE A	3/4:1 (53°)
TYPE B	1:1 (45°)
TYPE C	1 1/2:1 (34°)

- 1 Numbers in parentheses next to maximum allowable slopes are angles in degrees from the horizontal. Angles have been rounded off.
- 2 Sloping or benching for excavations greater than 20 feet deep must be designed by a registered professional engineer.

(3) Each soil and rock deposit must be classified by a competent person as Stable Rock, Type A, B, or C according

to the definitions in WAC 296-155-66401. "Competent person" means someone who is able to identify working conditions that are hazardous to employees, and has authority to take prompt action to eliminate the hazards.

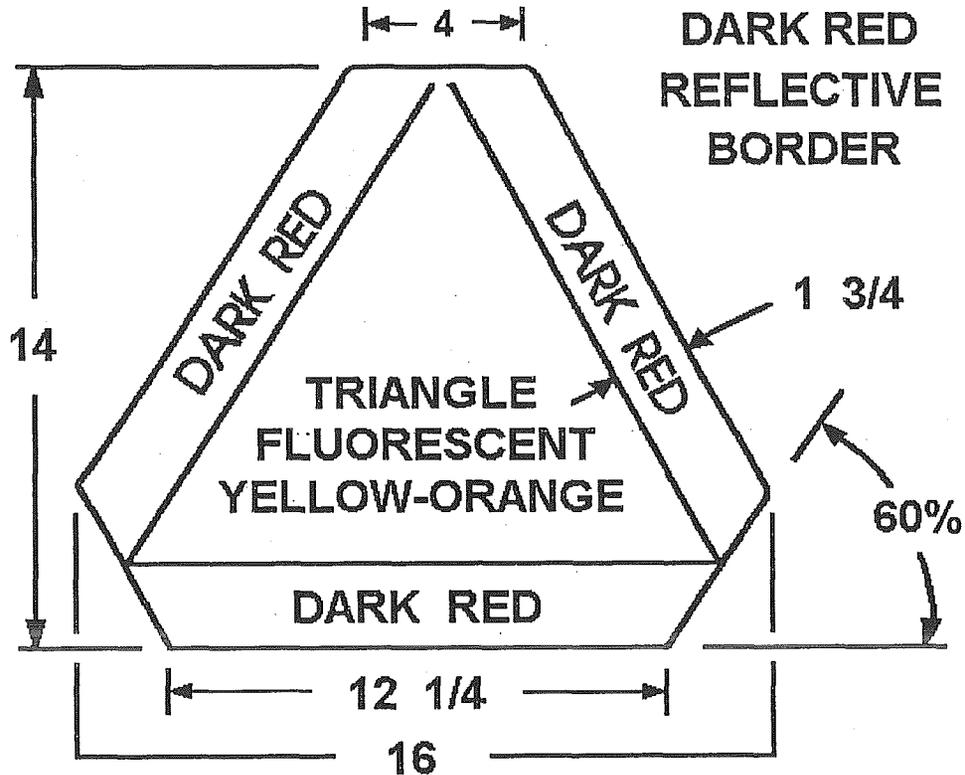
(4) Classification of the deposits must be based on the results of at least one visual and at least one manual analysis. The analyses must be conducted by a competent person using tests in recognized methods of soil classification and testing such as those adopted by the American Society for Testing Materials, or the U.S. Department of Agriculture textural classification system.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-061, filed 10/31/96, effective 12/1/96.]

**Part E
Vehicles and Farm Field Equipment**

WAC 296-306A-065 How must slow-moving vehicles be marked? (1) You must ensure that all farm tractors and other slow-moving farm vehicles and equipment used on public roads have lamps, reflectors, and a slow-moving vehicle emblem. From one-half hour after sunset to one-half hour before sunrise, slow-moving vehicles must have lights and reflectors.

(2) The slow-moving vehicle emblem is a fluorescent yellow-orange triangle with a dark red reflective border. (See figure.) The emblem must be used on public roads only by vehicles designed to move slowly (25 M.P.H. or less).



[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-065, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-070 Motor vehicles.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-070, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-07001 How must motor vehicles be maintained? (1) You must maintain all motor vehicles and their parts in good repair and safe condition.

(2) You must not use tires that are worn beyond the point of safety.

(3) Employees must report to you any motor vehicle or other farm equipment that is in unsafe operating condition. You must ensure that the vehicle or equipment is removed from service and repaired before use.

(4) Before an employee performs service or repair work under hydraulic or mechanical raised dump truck beds, blades, discs, or other equipment, the raised portion of the equipment must be manually pinned or blocked to prevent falling.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-07001, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-07003 How must motor vehicles be operated? (1) Vehicles must be driven at safe operating speed.

(2) Truck drivers must operate equipment at a safe speed for roadway conditions.

(3) When an employee backing a truck has obstructed vision, the employee must be assisted by a signaler. The signaler must have a clear view of the rear of the truck and the operator of the truck.

(4) Truck drivers must sound their horn before starting to back, and intermittently while backing.

(5) Shut off motors before refueling. Take care to prevent fuel from spilling on hot parts.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-07003, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-07005 Who may operate motor vehicles? Only qualified drivers may operate motor vehicles and must have a current motor vehicle operator's license.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-07005, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-07007 What requirements apply to motor vehicle brakes? (1) You must ensure that motor vehicles have brakes that will safely hold the maximum load on maximum grades.

(2) Trucks parked on an incline must have the steered wheels turned into the curb and must have at least one "driver" wheel chocked on each side, independent of the braking system.

Exception: If the truck has a functioning secondary braking system, the turned wheels and chock are not required.

(3) You must ensure that trailers have working air brakes, or another approved type. Air must be cut into the trailer brake system at the time that the trailer is coupled to the truck.

(4) The driver must test truck and trailer brakes before driving down a steep grade.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-07007, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-07009 How must motor vehicles be loaded and unloaded? (1) You must ensure that employees load and unload motor vehicles safely.

(2) All loads transported on trucks or truck and trailer combinations must be properly secured and distributed. Loads must not exceed the safe operating load for the roadway condition and the capacity of the bridges, trestles, and other structures.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-07009, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-07011 What safety equipment must motor vehicles have? All motor vehicles must have standard lights, horn, flags, flares, and other safety equipment that conforms to the state of Washington motor vehicles laws.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-07011, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-07013 What rules apply to vehicles used to transport employees? You must ensure that motor vehicles used regularly to transport employees meet the following requirements:

(1) The vehicles are well equipped, covered against the weather, and maintained in good mechanical condition at all times.

(2) A sufficient number of properly secured seats are provided in each vehicle to accommodate the number of employees transported. When emergency conditions make it necessary to transport more employees than the seating capacity can accommodate, all employees must ride within the vehicle. No employee may ride on fenders or running boards of the vehicle.

(3) No employees may ride in or on any vehicle with their legs hanging over the end or sides. All trucks without tail gates should have safety bars.

(4) The vehicles have storage strong enough to retain sharp tools that could present a hazard to employees being transported.

(5) All dump-trucks used to transport employees have an adequate safety chain or locking device to ensure that the body of the truck is not raised while employees are riding in it.

(6) Explosives or highly flammable materials are not carried in or on the vehicle while it is used to transport employees.

(7) Exhaust systems are installed and maintained in proper condition, and are designed to eliminate the employee exposure to exhaust gases and fumes.

(8) Within the cab, crew trucks must carry only the number of passengers for which they are designed. In any seating arrangement, the driver must be able to maintain full freedom of motion. The driver's normal vision must be free from obstruction by passengers or the seating arrangement.

(9) All enclosed crew trucks have an emergency exit in addition to the regular entrance.

(10) Trucks used for hauling gravel may be used as crew trucks if they meet the following requirements:

- (a) Steps in proper places;
- (b) Wooden floors;
- (c) Securely fastened seats;
- (d) Truck is properly covered; and
- (e) Compliance with all other general regulations covering crew trucks.

(11) Half-ton vehicles must haul no more than six persons including driver. Three-quarter-ton vehicles must haul no more than eight persons including driver.

(12) A vehicle used as a first-aid station has stretchers and fire extinguishers.

(13) Heating units with open fires are not used in vehicles transporting crews.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-07013, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-073 What requirements apply to changing and charging storage batteries? (1) Battery changing installations must be located in areas designated for that purpose.

- (2) Facilities must be provided for:
- Flushing and neutralizing spilled electrolyte;
 - Fire protection;
 - Protecting charging apparatus from damage by trucks;

and

- Adequate ventilation of fumes from gassing batteries.

(3) Racks used to support batteries should be made of or covered with materials that will not create sparks.

(4) A conveyor, overhead hoist, or equivalent material handling equipment must be provided for handling batteries.

(5) Reinstalled batteries must be properly positioned and secured in the vehicle.

(6) A carboy tilter or siphon must be provided for handling electrolyte.

(7) When mixing water and acid for charging batteries, pour acid into water; do not pour water into acid.

(8) Vehicles must be properly positioned and the brake applied before attempting to change or charge batteries.

(9) When charging batteries, the vent caps should be kept in place to avoid electrolyte spray. You must ensure that vent caps function. The battery (or compartment) cover(s) must be open for cooling.

(10) Precautions shall be taken to prevent open flames, sparks, or electric arcs in battery charging areas.

(11) Tools and other metallic objects must be kept away from the tops of uncovered batteries.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-073, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-076 How must farm field equipment be guarded? "Farm field equipment" means tractors or implements, including self-propelled implements, used in agricultural operations.

(1) All power transmission components must be guarded according to WAC 296-306A-280.

(2) The manufacturer's instruction manual, if published by the manufacturer and currently available, must be the source of information for the safe operation and maintenance of field equipment.

(3) You must ensure that all power takeoff shafts, including rear, mid-mounted or side-mounted shafts, are guarded by a master shield, as follows:

(a) The rear power takeoff has a master shield. The master shield is strong enough to prevent permanent deformation of the shield when a 250-pound operator mounts or dismounts the tractor using the shield as a step.

(b) Power takeoff driven equipment is guarded to prevent employee contact with rotating members of the power drive system. When the tractor master shield must be removed to use specific power takeoff driven equipment, the equipment must provide protection from the part of the tractor power takeoff shaft that protrudes from the tractor.

(c) Signs are placed at prominent locations on the tractor and on power takeoff driven equipment requiring that safety shields are kept in place.

(4) The following functional components must be shielded to a degree consistent with the intended function and operator's vision of the component.

- Snapping or husking rolls;
- Straw spreaders and choppers;
- Cutterbars;
- Flail rotors;
- Rotary beaters;
- Mixing augers;
- Feed rolls;
- Conveying augers;
- Rotary tillers; and
- Similar units that must be exposed for proper function

(5) Where removing a guard or access door will expose an employee to any component that continues to rotate after the power is disengaged, you must provide, in the immediate area:

(a) A safety sign warning the employee to look and listen for evidence of rotation and to wait until all components have stopped before removing the guard or access door.

(b) A readily visible or audible warning of rotation on equipment manufactured after October 25, 1976.

(6) If the mounting steps or ladder and the handholds of the propelling vehicle are made inaccessible by installation of other equipment, other steps and handholds must be provided on the equipment.

(7) You must ensure that the operator's steps and platform have a slip-resistant covering to minimize the possibility of slipping.

(8) Powered machines not driven by an individual motor must have a clutch or other effective means of stopping.

(9) All friction clutches must have sufficient clearance and be kept adjusted to prevent drag or creeping when disengaged.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-076, filed 10/31/96, effective 12/1/96.]

Part F

Rollover Protective Structures (ROPS) for Tractors

WAC 296-306A-080 Rollover protective structures (ROPS) for tractors.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-080, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-08003 Which agricultural tractors are covered by this section? All agricultural tractors manufactured after October 25, 1976, must meet the requirements of WAC 296-306A-080. An agricultural tractor manufactured on or before October 25, 1976, must meet the requirements of WAC 296-306A-080 if:

- (1) The tractor was built or sold with rollover protective structures (ROPS) as an optional accessory; or
- (2) According to the manufacturer, the tractor was designed to accommodate the addition of ROPS.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-08003, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-08006 What definitions apply to rollover protective structures (ROPS) for agricultural tractors? "Agricultural tractor" means a two-wheel-drive or four-wheel-drive vehicle, or a track vehicle of more than twenty net engine horsepower, designed to furnish the power to pull, carry, propel, or drive implements that are designed for agriculture. All human-powered implements are excluded.

"Low profile tractor" means a wheel or track-equipped vehicle with the following characteristics:

- The front wheel spacing is equal to the rear wheel spacing, as measured between the centerlines of the wheels;
- The clearance from the bottom of the tractor chassis to the ground is eighteen inches or less;
- The highest point of the hood is sixty inches or less, and
- The tractor is designed so that the operator straddles the transmission when seated.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-08006, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-08009 What requirements apply to the testing and performance of ROPS used on agricultural tractors? You must provide a rollover protective structure (ROPS) for each employee-operated tractor that is covered by WAC 296-306A-080. ROPS used on wheel-type tractors must meet the test and performance requirements of OSHA 1928.52 CFR, Protective Frames for Wheel Type Agricultural Tractors, and ROPS used on track-type tractors must meet the test and performance requirements of SAE Standard J334a (July 1970) and the portions of SAE Standard J167 (1971) pertaining to overhead protection requirements.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-08009, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-08012 What requirements apply to seatbelts used with ROPS on agricultural tractors? (1) Where ROPS are required by WAC 296-306A-080, you must:

- (a) Provide each tractor with a seatbelt;
- (b) Require that each employee use the seatbelt while the tractor is moving; and

(c) Require that each employee tighten the seatbelt sufficiently to confine the employee to the ROPS protected area.

(2) Each seatbelt and seatbelt anchorage must meet the requirements of ANSI/SAE J800 April 1986, Motor Vehicle Seat Belt Assemblies.

(a) Where a suspended seat is used, the seatbelt must be fastened to the movable portion of the seat.

(b) The seatbelt webbing material must be at least as resistant to acids, alkalis, mildew, aging, moisture and sunlight as untreated polyester fiber.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-08012, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-08015 When are ROPS not required on agricultural tractors? ROPS are not required on agricultural tractors that are used as follows:

(1) Low profile tractors used in orchards, vineyards or hop yards where the vertical clearance requirements would substantially interfere with normal operations, and for work related to these uses.

(2) Low profile tractors while used inside a farm building or greenhouse in which the vertical clearance is insufficient to allow a ROPS equipped tractor to operate.

(3) Tractors while used with mounted equipment that is incompatible with ROPS (for example, cornpickers, cotton strippers, vegetable pickers, and fruit harvesters).

(4) Track-type agricultural tractors whose overall width (measured between the outside edges of the tracks) is at least three times the height of the rated center of gravity, and whose rated maximum speed in forward or reverse is not greater than seven miles per hour, when used only for tillage or harvesting operations, and which:

(a) Does not involve operating on slopes in excess of forty percent from horizontal; and

(b) Does not involve operating on piled crop products or residue (for example: Silage in stacks or pits); and

(c) Does not involve operating in close proximity to irrigation ditches, streams or other excavations more than two feet deep that contain slopes of more than forty percent from horizontal; and

(d) Does not involve construction-type operation, such as bulldozing, grading, or land clearing.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-08015, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-08018 What employee training requirements apply to ROPS used on agricultural tractors? (1) You must ensure that every employee who operates an agricultural tractor is informed of the operating practices listed below and of any other practices dictated by the work environment. You must provide the information at the time of initial assignment and at least annually thereafter.

(2) You must ensure that every employee who operates an agriculture tractor is trained specifically in the operation of the tractor to be used. The training must include an orientation of the operator to the topographical features of the land where the tractor will be operated. Training must emphasize safe operating practices to avoid rollover.

(3) The tractor training program must be described in the written accident prevention program required by WAC 296-306A-030.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-08018, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-08021 What other requirements apply to ROPS used on agricultural tractors? (1) You must ensure that batteries, fuel tanks, oil reservoirs, and coolant systems are constructed and located or sealed to ensure that no spillage comes in contact with the operator in the event of an upset.

(2) All sharp edges and corners at the operator's station must be designed to minimize operator injury in the event of an upset.

(3) When ROPS are removed, they must be remounted to meet the requirements of WAC 296-306A-080.

(4) You must ensure that each ROPS has a label, permanently affixed to the structure, that states:

- (a) Manufacturer's or fabricator's name and address;
- (b) ROPS model number, if any;

(c) Tractor makes, models, or series numbers that the structure is designed to fit; and

(d) That the ROPS model was tested in accordance with the requirements of this section.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-08021, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-085 When must ROPS be provided for material handling equipment? (1) This section applies to the following types of material handling equipment: Rubber-tired, self-propelled scrapers; rubber-tired front-end loaders; rubber-tired dozers; wheel-type agricultural and industrial tractors; crawler tractors; crawler-type loaders; and motor graders, with or without attachments, that are used in agricultural work. This section does not apply to side-boom pipelaying tractors.

(2) You must ensure that material handling equipment manufactured on or after October 25, 1976, is equipped with ROPS that meet the minimum performance standards of WAC 296-306A-08009.

(3) ROPS and supporting attachments must meet the minimum performance standards of OSHA 1928.52 CFR, Protective Frames for Wheel Type Agricultural Tractors, or must be designed, fabricated, and installed in a manner that will support, based on the ultimate strength of the metal, at least two times the weight of the prime mover applied at the point of impact.

(a) The ROPS must be designed to minimize the likelihood of a complete overturn and to minimize the possibility of the operator being crushed in a rollover.

(b) The design must provide a vertical clearance of at least fifty-two inches from the work deck to the ROPS at the entrance.

(4) When ROPS are removed, they must be remounted so as to meet the requirements of this section.

(5) Each ROPS must have a label, permanently affixed to the structure, that states:

- (a) Manufacturer's or fabricator's name and address;
- (b) ROPS model number, if any;

(c) Tractor makes, models, or series numbers that the structure is designed to fit; and

(d) That the ROPS model was tested in accordance with the requirements of this section.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-085, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-090 What requirements apply to overhead protection for operators of agricultural and industrial tractors? This section applies to wheel-type agricultural tractors used in construction work and to wheel-type industrial tractors used in agriculture work.

(1) If grid or mesh is used for overhead protection, the largest permissible opening is 1.5 in. (38 mm.) in diameter. The overhead protection must not be installed in such a way as to become a hazard in the case of upset.

(2) All equipment used in site clearing operations must have rollover guards meeting the requirements of this chapter. You must ensure that rider-operated equipment is equipped with an overhead and rear canopy guard meeting the following requirements:

(a) The overhead covering is at least eighth-inch steel plate or quarter-inch woven wire mesh with openings no greater than one inch, or equivalent.

(b) The opening in the rear of the canopy structure is covered with not less than quarter-inch woven wire mesh with openings no greater than one inch.

(3) Overhead protection that meets the provisions of SAE Standard J334 (July 1970) for rubber-tired dozers and rubber-tired loaders also meets the requirements of this standard.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-090, filed 10/31/96, effective 12/1/96.]

Part G Field Sanitation

WAC 296-306A-095 Field sanitation.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-095, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-09503 What does this section cover? WAC 296-306A-095 applies to any agricultural employer with one or more employees engaged in any hand-labor operations in the field.

Exception: WAC 296-306A-09515 (handwashing facilities) and 296-306A-09518 (toilet facilities) do not apply if your employees:

- (1) Are engaged in field activities for the production of grains, seeds, livestock, or livestock feed; or
- (2) Use vehicles, machinery, or animals as part of their field activities and, when needed, can transport themselves to and from toilet and handwashing facilities.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-09503, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-09506 What definitions apply to this section? "Accessible" means a maximum of one-quarter mile or five minutes travel time from the worksite.

"Hand-labor operations" means agricultural operations performed by hand or with hand tools.

For example: The hand cultivation, weeding, planting or harvesting of vegetables, nuts, fruit, seedlings or other crops, including mushrooms, and hand packing into containers.

Exception: Hand-labor does not include logging operations, the care or feeding of livestock, or hand-labor operations in permanent structures (e.g., canning facilities or packing houses).

"Handwashing facility" means a facility that meets the requirements of WAC 296-306A-09515 and is approved by the local health authority.

"Toilet" means a fixed or portable facility designed for the purpose of adequate collection and containment of both defecation and urination. "Toilet" includes biological, chemical, flush, and combustion toilets, or sanitary outhouses.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-09506, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-09509 What orientation must employers provide for field sanitation? You must provide each employee with verbal orientation on field sanitation facilities. The orientation must be understandable to each employee and must include:

- (1) The location of potable water supplies;
- (2) Identification of all nonpotable water at the worksite and prohibition of the use of nonpotable water with an explanation of the hazards associated with using nonpotable water;
- (3) The location of handwashing facilities with an explanation of when and how they should be used and the hazards associated with not using them; and
- (4) The location of toilet facilities; an explanation that facilities are for employee convenience and health considerations; the necessity to keep them sanitary; and that using the fields, orchards, or forests is not an option.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-09509, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-09512 What potable water sources must an employer provide? You must provide potable water for employees engaged in hand-labor operations in the field, without cost to the employee. Potable water must meet the following requirements:

- (1) Potable water is in locations that are accessible to all employees.
- (2) Potable water containers are refilled daily or more often as necessary.
- (3) Potable water dispensers are designed, constructed, and serviced so that sanitary conditions are maintained. They are closeable and equipped with a tap.
- (4) Open containers such as barrels, pails, or tanks for drinking water from which water must be dipped or poured, whether or not they are fitted with a cover, are prohibited.
- (5) Any container used to distribute drinking water is clearly marked in English and with the appropriate international symbol describing its contents.
- (6) Any container used to distribute drinking water is only used for that purpose.

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(7) Potable water is suitably cool and provided in sufficient amounts, taking into account the air temperature, humidity, and the nature of the work performed, to meet employees' needs.

Note: Suitably cool water should be sixty degrees Fahrenheit or less. During hot weather, employees may require up to three gallons of water per day.

(8) The use of common drinking cups or dippers is prohibited. Water is dispensed in single-use drinking cups, personal containers, or by water fountains.

"Single-use drinking cups" means containers of any type or size, disposable or not, and including personal containers if the choice to use a personal container is made by the employee, not the employer.

(9) Employees must be prohibited from drinking from irrigation ditches, creeks or rivers. Potable water must meet the quality standards for drinking purposes of the state or local authority, or must meet quality standards of the United States Environmental Protection Agency's National Interim—Primary Drinking Water Regulations, published in 40 CFR Part 141 and 40 CFR 147.2400.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-09512, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-09515 What handwashing facilities must an employer provide? You must provide handwashing facilities for employees engaged in hand-labor operations in the field, without cost to the employee. Handwashing facilities must meet the following requirements:

- (1) One handwashing facility with a tap and an adequate supply of water, soap, single-use hand towels, and either a basin or other suitable container for washing is provided for each twenty employees or fraction of twenty.

Note: Nonpotable water must not be used for washing any part of a person, except as permitted by the local health authority.

- (2) Each facility has running water.
- (3) Each facility has a dispenser containing handsoap or a similar cleansing agent.
- (4) Each facility has individual single-use hand towels.
- (5) Facilities are maintained in a clean and sanitary condition according to appropriate public health sanitation practices.
- (6) Waste receptacles are provided. Disposal of wastes from the facilities does not create a hazard nor cause an unsanitary condition.
- (7) Employees are allowed reasonable time during the work period to use the facilities.
- (8) Handwashing facilities are near toilet facilities and within one-quarter mile of each employee's worksite in the field.

Exception: Where it is not feasible to locate facilities as required above, the facilities must be located at the point of closest vehicular access.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-09515, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-09518 What toilet facilities must an employer provide? You must provide toilet facilities for employees engaged in hand-labor operations in the field,

without cost to the employee. Toilet facilities must meet the following requirements:

(1) One toilet facility is provided for each twenty employees or fraction of twenty.

(2) You must ensure, at the beginning of each day, that the toilets are inspected. If any toilet facility fails to meet the requirements of this section, immediate corrective action is taken. Inspections are documented and the record maintained at the worksite for at least seventy-two hours.

(3) Toilet facilities are adequately ventilated; appropriately screened, and have self-closing doors that can be closed and latched from the inside. Toilet facilities are constructed to ensure privacy.

(4) Facilities are maintained in a clean, sanitary, and functional condition and according to appropriate public health sanitation practices.

(5) Toilets are supplied with toilet paper.

(6) Disposal of wastes from the facilities does not create a hazard or cause an unsanitary condition.

(7) Employees are allowed reasonable time during the work period to use the facilities.

(8) Facilities are near handwashing facilities and within one-quarter mile of each employee's worksite in the field.

Exception: Where it is not feasible to locate facilities as required above, the facilities must be located at the point of closest vehicular access.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-09518, filed 10/31/96, effective 12/1/96.]

Part H Personal Protective Equipment

WAC 296-306A-100 Personal protective equipment.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-100, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-10005 Who must provide personal protective equipment? (1) You must ensure that employees are protected from injury or impairment of any bodily function that might occur through absorption, inhalation or physical contact of any substance, vapor, radiation, or physical hazard. Wherever appropriate, you must ensure that employees use protective clothing; respiratory devices; shields; barriers; and adequate protective equipment for eyes, face, head, and extremities.

(2) You must provide personal protective equipment at no cost to employees, including replacement due to normal wear and tear. The equipment must be maintained in sanitary and reliable condition.

Exception: You may require employees to provide their own normal work clothing, including long-sleeved shirts, long-legged pants, and socks.

(3) If employees provide their own protective equipment, then you must ensure that the equipment is adequate, properly maintained, and sanitary.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-10005, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-10010 What requirements apply to eye protection? You must require eye protection wherever employees are exposed to flying objects, welding or cutting glare, injurious liquids, or injurious radiation. Eye protectors must meet the criteria of the American National Standard for Occupational and Educational Eye and Face Protection.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-10010, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-10015 How must personal protective equipment be used? (1) You must ensure that employees use personal protective equipment according to the manufacturer's instructions.

(2) You must ensure that, before each use, employees inspect all personal protective equipment for leaks, holes, tears, or worn places, and any damaged equipment is repaired or discarded.

(3) The employee must use personal protective equipment according to instructions and training received.

(4) The employee shall notify you of any defects in personal protective equipment or when the equipment becomes contaminated.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-10015, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-10020 What must an employer do to prevent heat-related illness? You must take appropriate measures to prevent heat-related illness that may be caused by employees wearing any required personal protective equipment.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-10020, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-10025 What instruction on personal protective equipment must an employer give to employees? You must instruct each employee in the proper use of personal protective equipment. The instruction must include any special limitations or precautions indicated by the manufacturer.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-10025, filed 10/31/96, effective 12/1/96.]

PART I: PESTICIDES (WORKER PROTECTION STANDARD)

WAC 296-306A-107 Federal worker protection standards—Washington state department of agriculture. This chapter contains the federal Environmental Protection Agency worker protection standards as listed in 40 CFR, Part 170. Revisions to the federal language have been incorporated into this chapter in order to be consistent with other requirements of Washington state law. These rules are adopted in conjunction with rules adopted by the Washington state department of agriculture in chapter 16-233 WAC.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-20-082, § 296-306A-107, filed 9/30/96, effective 11/1/96.]

WAC 296-306A-110 Scope and purpose—Worker protection standards—40 CFR, § 170.1. This part contains standards designed to reduce the risks of illness or injury

resulting from workers' and handlers' occupational exposures to pesticides used in the production of agricultural plants on farms or in nurseries, greenhouses, and forests and also to reduce the accidental exposure of workers and other persons to such pesticides. It requires workplace practices designed to reduce or eliminate exposure to pesticides and establishes procedures for responding to exposure-related emergencies.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-20-082, § 296-306A-110, filed 9/30/96, effective 11/1/96.]

WAC 296-306A-11005 Definitions—Worker protection standards—40 CFR, § 170.3. Terms used in this part have the same meanings they have in the Federal Insecticide, Fungicide, and Rodenticide Act, as amended. In addition, the following terms, when used in this part, shall have the following meanings:

"Agricultural emergency" means a sudden occurrence or set of circumstances which the agricultural employer could not have anticipated and over which the agricultural employer has no control, and which requires entry into a pesticide treated area during a restricted-entry interval, when no alternative practices would prevent or mitigate a substantial economic loss.

"Agricultural employer" means any person who hires or contracts for the services of workers, for any type of compensation, to perform activities related to the production of agricultural plants, or any person who is an owner of or is responsible for the management or condition of an agricultural establishment that uses such workers.

Note: This definition does not conflict with the definition of employer in WAC 296-306A-012.

"Agricultural establishment" means any farm, forest, nursery, or greenhouse.

Note: This applies to all the Standard Industrial Classification (SIC) Codes listed in WAC 296-306A-010.

"Agricultural plant" means any plant grown or maintained for commercial or research purposes and includes, but is not limited to, food, feed, and fiber plants; trees; turfgrass; flowers, shrubs; ornamentals; and seedlings.

"Animal premise" means the actual structure used to house, cage or confine animals such as: Barns, poultry houses, mink sheds, corrals, or structures used for shelter.

"Chemigation" means the application of pesticides through irrigation systems.

"Commercial pesticide handling establishment" means any establishment, other than an agricultural establishment, that:

- Employs any person, including a self-employed person, to apply on an agricultural establishment, pesticides used in the production of agricultural plants.

- Employs any person, including a self-employed person, to perform on an agricultural establishment, tasks as a crop advisor.

"Crop advisor" means any person who is assessing pest numbers or damage, pesticide distribution, or the status or requirements of agricultural plants and who holds a current Washington state department of agriculture commercial consultant license in the agricultural areas in which they are advising. The term does not include any person who is performing hand labor tasks.

"Early entry" means entry by a worker into a treated area on the agricultural establishment after a pesticide application is complete, but before any restricted-entry interval for the pesticide has expired.

"Farm" means any operation, other than a nursery or forest, engaged in the outdoor production of agricultural plants.

"Forest" means any operation engaged in the outdoor production of any agricultural plant to produce wood fiber or timber products.

"Fumigant" means any pesticide product that is a vapor or gas, or forms a vapor or gas on application, and whose method of pesticidal action is through the gaseous state.

"Greenhouse" means any operation engaged in the production of agricultural plants inside any structure or space that is enclosed with nonporous covering and that is of sufficient size to permit worker entry. This term includes, but is not limited to, polyhouses, mushroom houses, rhubarb houses, and similar structures. It does not include such structures as malls, atriums, conservatories, arboretums, or office buildings where agricultural plants are present primarily for aesthetic or climatic modification.

"Hand labor" means any agricultural activity performed by hand or with hand tools that causes a worker to have substantial contact with surfaces (such as plants, plant parts, or soil) that may contain pesticide residues. These activities include, but are not limited to, harvesting, detasseling, thinning, weeding, topping, planting, sucker removal, pruning, disbudding, roguing, and packing produce into containers in the field. Hand labor does not include operating, moving, or repairing irrigation or watering equipment or performing the tasks of crop advisors.

"Handler" means any person, including a self-employed person:

- Who is employed for any type of compensation by an agricultural establishment or commercial pesticide handling establishment to which WAC 296-306A-130 applies and who is:

- Mixing, loading, transferring, or applying pesticides.
- Disposing of pesticides or pesticide containers.
- Handling opened containers of pesticides.
- Acting as a flagger.
- Cleaning, adjusting, handling, or repairing the parts of mixing, loading, or application equipment that may contain pesticide residues.
- Assisting with the application of pesticides.
- Entering a greenhouse or other enclosed area after the application and before the inhalation exposure level listed in the labeling has been reached or one of the ventilation criteria established by WAC 296-306A-12015 (3)(c) or in the labeling has been met:
 - ◆ To operate ventilation equipment.
 - ◆ To adjust or remove coverings used in fumigation.
 - ◆ To monitor air levels.
- Entering a treated area outdoors after application of any soil fumigant to adjust or remove soil coverings such as tarpaulins.
- Performing tasks as a crop advisor:
 - ◆ During any pesticide application.
 - ◆ Before the inhalation exposure level listed in the labeling has been reached or one of the ventilation criteria

established by WAC 296-306A-12015 (3)(c) or in the labeling has been met.

◆ During any restricted-entry interval.

• The term does not include any person who is only handling pesticide containers that have been emptied or cleaned according to pesticide product labeling instructions or, in the absence of such instructions, have been subjected to triple-rinsing or its equivalent.

"Handler employer" means any person who is self-employed as a handler or who employs any handler, for any type of compensation.

"Immediate family" includes only spouse, children, stepchildren, foster children, parents, stepparents, foster parents, brothers, and sisters.

"Nursery" means any operation engaged in the outdoor production of any agricultural plant to produce cut flowers and ferns or plants that will be used in their entirety in another location. Such plants include, but are not limited to, flowering and foliage plants or trees; tree seedlings; live Christmas trees; vegetable, fruit, and ornamental transplants; and turfgrass produced for sod.

"Owner" means any person who has a present possessory interest (fee, leasehold, rental, or other) in an agricultural establishment covered by this chapter. A person who has both leased such agricultural establishment to another person and granted that same person the right and full authority to manage and govern the use of such agricultural establishment is not an owner for purposes of this part.

"Restricted-entry interval" means the time after the end of a pesticide application during which entry into the treated area is restricted.

"Substantial economic loss" means a loss in profitability greater than that which would be expected based on the experience and fluctuations of crop yields in previous years. Only losses caused by the agricultural emergency specific to the affected site and geographic area are considered. The contribution of mismanagement cannot be considered in determining the loss.

"Treated area" means any area to which a pesticide is being directed or has been directed.

"Worker" means any person, including a self-employed person, who is employed for any type of compensation and who is performing activities relating to the production of agricultural plants on an agricultural establishment to which WAC 296-306A-120 applies. While persons employed by a commercial pesticide handling establishment are performing tasks as crop advisors, they are not workers covered by the requirements of WAC 296-306A-120.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-20-082, § 296-306A-11005, filed 9/30/96, effective 11/1/96.]

WAC 296-306A-11010 General duties and prohibited actions—Worker protection standards—40 CFR, § 170.7. (1) General duties. The agricultural employer or the handler employer, as appropriate, shall:

(a) Assure that each worker subject to WAC 296-306A-120 or each handler subject to WAC 296-306A-130 receives the protections required by this part.

(b) Assure that any pesticide to which WAC 296-306A-130 applies is used in a manner consistent with the labeling of the pesticide, including the requirements of this part.

(c) Provide, to each person who supervises any worker or handler, information and directions sufficient to assure that each worker or handler receives the protections required by this part. Such information and directions shall specify which persons are responsible for actions required to comply with this part.

(d) Require each person who supervises any worker or handler to assure compliance by the worker or handler with the provisions of this part and to assure that the worker or handler receives the protections required by this part.

(2) Prohibited actions. The agricultural employer or the handler employer shall not take any retaliatory action for attempts to comply with this part or any action having the effect of preventing or discouraging any worker or handler from complying or attempting to comply with any requirement of this part.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-20-082, § 296-306A-11010, filed 9/30/96, effective 11/1/96.]

WAC 296-306A-11015 Violations of this part—Worker protection standards—40 CFR, § 170.9. (1) RCW 15.58.150 (2)(c) provides that it is unlawful for any person ". . . to use or cause to be used any pesticide contrary to label directions . . ." When 40 CFR, Part 170 is referenced on a label, users must comply with all of its requirements except those that are inconsistent with product specific instructions on the labeling. For purposes of this chapter, the term "use" is interpreted to include:

(a) Preapplication activities, including, but not limited to:

- (i) Arranging for the application of the pesticide;
- (ii) Mixing and loading the pesticide; and

(iii) Making necessary preparations for the application of the pesticide, including responsibilities related to worker notification, training of handlers, decontamination, use and care of personal protective equipment, emergency information, and heat stress management.

(b) Application of the pesticide.

(c) Post-application activities necessary to reduce the risks of illness and injury resulting from handlers' and workers' occupational exposures to pesticide residues during the restricted-entry interval plus thirty days. These activities include, but are not limited to, responsibilities related to worker training, notification, and decontamination.

(d) Other pesticide-related activities, including, but not limited to, providing emergency assistance, transporting or storing pesticides that have been opened, and disposing of excess pesticides, spray mix, equipment wash waters, pesticide containers, and other pesticide-containing materials.

(2) A person who has a duty under this chapter, as referenced on the pesticide product label, and who fails to perform that duty, violates RCW 15.58.330 and 17.21.315, and is subject to civil penalties under RCW 15.58.335, 15.58.260 and 17.21.315.

(3) FIFRA section 14 (b)(4) provides that a person is liable for a penalty under FIFRA if another person employed by or acting for that person violates any provision of FIFRA. The term "acting for" includes both employment and contractual relationships.

(4) The requirements of this chapter, including the decontamination requirements, shall not, for the purposes of

section 653 (b)(1) of Title 29 of the U.S. Code, be deemed to be the exercise of statutory authority to prescribe or enforce standards or regulations affecting the general sanitary hazards addressed by the WISHA Field Sanitation Standard, WAC 296-24-120, or other agricultural, nonpesticide hazards.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-20-082, § 296-306A-11015, filed 9/30/96, effective 11/1/96.]

STANDARD FOR WORKERS

WAC 296-306A-120 Applicability of this section—Standards for workers—40 CFR, § 170.102. Requirement. Except as provided by WAC 296-306A-12005 and 296-306A-12010, WAC 296-306A-120 applies when any pesticide product is used on an agricultural establishment in the production of agricultural plants.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-20-082, § 296-306A-120, filed 9/30/96, effective 11/1/96.]

WAC 296-306A-12005 Exceptions—Standards for workers—40 CFR, § 170.103. This section does not apply when any pesticide is applied on an agricultural establishment in the following circumstances:

(1) For mosquito abatement, Mediterranean fruit fly eradication, or similar wide-area public pest control programs sponsored by governmental entities.

(2) On livestock or other animals, or in or about animal premises.

(3) On plants grown for other than commercial or research purposes, which may include plants in habitations, home fruit and vegetable gardens, and home greenhouses.

(4) On plants that are in ornamental gardens, parks, and public or private lawns and grounds that are intended only for aesthetic purposes or climatic modification.

(5) By injection directly into agricultural plants. Direct injection does not include "hack and squirt," "frill and spray," chemigation, soil-incorporation, or soil-injection.

(6) In a manner not directly related to the production of agricultural plants, including, but not limited to, structural pest control, control of vegetation along rights-of-way and in other noncrop areas, and pasture and rangeland use.

(7) For control of vertebrate pests.

(8) As attractants or repellents in traps.

(9) On the harvested portions of agricultural plants or on harvested timber.

(10) For research uses of unregistered pesticides.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-20-082, § 296-306A-12005, filed 9/30/96, effective 11/1/96.]

WAC 296-306A-12010 Exemptions—Standards for workers—40 CFR, § 170.104. The workers listed in this section are exempt from the specified provisions of WAC 296-306A-120.

(1) Owners of agricultural establishments.

(a) The owner of an agricultural establishment is not required to provide to himself/herself or members of his/her immediate family who are performing tasks related to the production of agricultural plants on their own agricultural establishment the protections of:

- (i) WAC 296-306A-12020 (3)(e) through (i);
- (ii) WAC 296-306A-12020 (3)(e) through (i); as referenced in WAC 296-306A-12020 (4)(b)(iii) and (5);
- (iii) WAC 296-306A-12025;
- (iv) WAC 296-306A-12030;
- (v) WAC 296-306A-12040;
- (vi) WAC 296-306A-12045;
- (vii) WAC 296-306A-12050;
- (viii) WAC 296-306A-12055.

(b) The owner of the agricultural establishment must provide the protections listed in (a)(i) through (viii) of this subsection to other workers and other persons who are not members of his/her immediate family.

(2) Crop advisors.

(a) Provided that the conditions of this section are met, a person who is certified or licensed as a crop advisor by a program acknowledged as appropriate in writing by EPA or a State or Tribal lead agency for pesticide enforcement, and persons performing crop advising tasks under such qualified crop advisor's direct supervision, are exempt from the provisions of:

(i) WAC 296-306A-12050.

(ii) WAC 296-306A-12055.

A person is under the direct supervision of a crop advisor when the crop advisor exerts the supervisory controls set out in (b)(iii) and (iv) of this subsection. Direct supervision does not require that the crop advisor be physically present at all times, but the crop advisor must be readily accessible to the employees at all times.

(b) Conditions of exemption.

(i) The certification or licensing program requires pesticide safety training that includes, at least, all the information in WAC 296-306A-13025 (3)(d).

(ii) Applies only when performing crop advising tasks in the treated area.

(iii) The crop advisor must make specific determinations regarding the appropriate PPE, appropriate decontamination supplies, and how to conduct the tasks safely. The crop advisor must convey this information to each person under his direct supervision in a language that the person understands.

(iv) Before entering a treated area, the certified or licensed crop advisor must inform, through an established practice of communication, each person under his/her direct supervision of the pesticide product and active ingredient(s) applied, method of application, time of application, the restricted entry interval which tasks to undertake, and how to contact the crop advisor.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-20-082, § 296-306A-12010, filed 9/30/96, effective 11/1/96.]

WAC 296-306A-12015 Restrictions associated with pesticide applications—Standards for workers—40 CFR, § 170.110. (1) Farms and forests. During the application of any pesticide on a farm or in a forest, the agricultural employer shall not allow or direct any person, other than an appropriately trained and equipped handler, to enter or to remain in the treated area.

(2) Nurseries. In a nursery, during any pesticide application described in column A of Table 1 of this section, the agricultural employer shall not allow or direct any

person, other than an appropriately trained and equipped handler, to enter or to remain in the area specified in column B of Table 1 of this section. After the application is completed, until the end of any restricted-entry interval, the entry-restricted area is the treated area.

Table 1.—Entry-Restricted Areas in Nurseries During Pesticide Applications

A. During Application of a Pesticide:	B. Workers are Prohibited in:
<p>(1)(a) Applied:</p> <ul style="list-style-type: none"> (i) Aerially, or (ii) In an upward direction, or (iii) Using a spray pressure greater than 150 psi, or <p>(b) Applied as a:</p> <ul style="list-style-type: none"> (i) Fumigant, or (ii) Smoke, or (iii) Mist, or (iv) Fog, or (v) Aerosol. 	Treated area plus 100 feet in all directions on the nursery
<p>(2)(a) Applied downward using:</p> <ul style="list-style-type: none"> (i) A height of greater than 12 inches from the planting medium, or (ii) A fine spray, or (iii) A spray pressure greater than 40 psi and less than 150 psi. <p>(b) Not as in 1 or 2(a) above but for which a respiratory protection device is required for application by the product labeling.</p>	Treated area plus 25 feet in all directions on the nursery
<p>(3) Applied otherwise.</p>	Treated area
<p>(3) Greenhouses.</p>	<p>measured to be equal to or less than the inhalation exposure level the labeling requires to be achieved. If no inhalation exposure level is listed on the labeling, ventilation shall continue until after:</p>
<p>(a) When a pesticide application described in column A of Table 2 under (d) of this subsection takes place in a greenhouse, the agricultural employer shall not allow or direct any person, other than an appropriately trained and equipped handler, to enter or to remain in the area specified in column B of Table 2 until the time specified in column C of Table 2 has expired.</p>	<ul style="list-style-type: none"> (i) Ten air exchanges are completed; or (ii) Two hours of ventilation using fans or other mechanical ventilating systems; or (iii) Four hours of ventilation using vents, windows or other passive ventilation; or (iv) Eleven hours with no ventilation followed by one hour of mechanical ventilation; or (v) Eleven hours with no ventilation followed by two hours of passive ventilation; or (vi) Twenty-four hours with no ventilation.
<p>(b) After the time specified in column C of Table 2 under (d) of this subsection has expired, until the expiration of any restricted-entry interval, the agricultural employer shall not allow or direct any worker to enter or to remain in the treated area as specified in column D of Table 2 under (d) of this subsection, except as provided in WAC 296-306A-12020.</p>	<p>(d) The following Table 2 applies to (a), (b) and (c) of this subsection.</p>
<p>(c) When column C of Table 2 under (d) of this subsection specifies that ventilation criteria must be met, ventilation shall continue until the air concentration is</p>	

Table 2.—Greenhouse Entry Restrictions Associated With Pesticide Applications

A. When a Pesticide is Applied:	B. Workers are Prohibited in:	C. Until:	D. After the Expiration of Time in Column C Until the Restricted-Entry Interval Expires, the Entry-Restricted Area is:
(1) As a fumigant	Entire greenhouse plus any adjacent structure that cannot be sealed off from the treated area	The ventilation criteria of (c) of this subsection are met	No entry restrictions after criteria in column C are met
(2) As a:	Entire enclosed area	The ventilation criteria of (c) of this subsection are met	Entire enclosed area is the treated area
(i) Smoke, or (ii) Mist, or (iii) Fog, or (iv) Aerosol			
(3) Not in 1 or 2 above, and for which a respiratory protection device is required for application by the product labeling	Entire enclosed area	The ventilation criteria of (c) of this subsection are met	Treated area
(4) Not in 1, 2, or 3 above, and:	Treated area plus 25 feet in all directions in the enclosed area	Application is complete	Treated area
(i) From a height of greater than 12 in. from the planting medium, or (ii) As a fine spray, or (iii) Using a spray pressure greater than 40 psi			
(5) Otherwise	Treated area	Application is complete	Treated area

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-20-082, § 296-306A-12015, filed 9/30/96, effective 11/1/96.]

WAC 296-306A-12020 Entry restrictions—Standards for workers—40 CFR, § 170.112. (1) General restrictions.

(a) After the application of any pesticide on an agricultural establishment, the agricultural employer shall not allow or direct any worker to enter or to remain in the treated area before the restricted-entry interval specified on the pesticide labeling has expired, except as provided in this section.

(b) Entry-restricted areas in greenhouses are specified in column D in Table 2 under WAC 296-306A-12015 (3)(d).

(c) When two or more pesticides are applied at the same time, the restricted-entry interval shall be the longest of the applicable intervals.

(d) The agricultural employer shall assure that any worker who enters a treated area under a restricted-entry interval as permitted by subsections (3), (4), and (5) of this section uses the personal protective equipment specified in the product labeling for early entry workers and follows any

other requirements on the pesticide labeling regarding early entry.

(2) Exception for activities with no contact. A worker may enter a treated area during a restricted-entry interval if the agricultural employer assures that both of the following are met:

(a) The worker will have no contact with anything that has been treated with the pesticide to which the restricted-entry interval applies, including, but not limited to, soil, water, air, or surfaces of plants; and

(b) No such entry is allowed until any inhalation exposure level listed in the labeling has been reached or any ventilation criteria established by WAC 296-306A-12015 (3)(c) or in the labeling have been met.

(3) Exception for short-term activities. A worker may enter a treated area during a restricted-entry interval for short-term activities if the agricultural employer assures that the following requirements are met:

(a) No hand labor activity is performed.

(b) The time in treated areas under a restricted-entry interval for any worker does not exceed one hour in any twenty-four-hour period.

(c) No such entry is allowed for the first four hours following the end of the application, and no such entry is allowed thereafter until any inhalation exposure level listed in the labeling has been reached or any ventilation criteria established by WAC 296-306A-12015 (3)(c) or in the labeling have been met.

(d) The personal protective equipment specified on the product labeling for early entry is provided to the worker. Such personal protective equipment shall conform to the following standards:

(i) Personal protective equipment (PPE) means devices and apparel that are worn to protect the body from contact with pesticides or pesticide residues, including, but not limited to, coveralls, chemical-resistant suits, chemical-resistant gloves, chemical-resistant footwear, respiratory protection devices, chemical-resistant aprons, chemical-resistant headgear, and protective eyewear.

(ii) Long-sleeved shirts, short-sleeved shirts, long pants, short pants, shoes, socks, and other items of work clothing are not considered personal protective equipment for the purposes of this section and are not subject to the requirements of this section, although pesticide labeling may require that such work clothing be worn during some activities.

(iii) When "chemical-resistant" personal protective equipment is specified by the product labeling, it shall be made of material that allows no measurable movement of the pesticide being used through the material during use.

(iv) When "waterproof" personal protective equipment is specified by the product labeling, it shall be made of material that allows no measurable movement of water or aqueous solutions through the material during use.

(v) When a "chemical-resistant suit" is specified by the product labeling, it shall be a loose-fitting, one-piece or two-piece, chemical-resistant garment that covers, at a minimum, the entire body except head, hands, and feet.

(vi) When "coveralls" are specified by the product labeling, they shall be a loose-fitting, one-piece or two-piece garment, such as a cotton or cotton and polyester coverall, that covers, at a minimum, the entire body except head, hands, and feet. The pesticide product labeling may specify that the coveralls be worn over a layer of clothing. If a chemical-resistant suit is substituted for coveralls, it need not be worn over a layer of clothing.

(vii) Gloves shall be of the type specified by the product labeling. Gloves or glove linings made of leather, cotton, or other absorbent materials must not be worn for early entry activities unless these materials are listed on the product labeling as acceptable for such use. If chemical-resistant gloves with sufficient durability and suppleness are not obtainable for tasks with roses or other plants with sharp thorns, leather gloves may be worn over chemical-resistant liners. However, once leather gloves have been worn for this use, thereafter they shall be worn only with chemical-resistant liners and they shall not be worn for any other use.

(viii) When "chemical-resistant footwear" is specified by the product labeling, it shall be one of the following types of footwear: Chemical-resistant shoes, chemical-resistant boots, or chemical-resistant shoe coverings worn over shoes or boots. If chemical-resistant footwear with sufficient durability and a tread appropriate for wear in rough terrain is not obtainable for workers, then leather boots may be worn in such terrain.

(ix) When "protective eyewear" is specified by the product labeling, it shall be one of the following types of eyewear: Goggles; face shield; safety glasses with front, brow, and temple protection; or a full-face respirator.

(x) When "chemical-resistant headgear" is specified by the product labeling, it shall be either a chemical-resistant hood or a chemical-resistant hat with a wide brim.

(e) The agricultural employer shall assure that the worker, before entering the treated area, either has read the product labeling or has been informed, in a manner that the worker can understand, of all labeling requirements related to human hazards or precautions, first aid, symptoms of poisoning, personal protective equipment specified for early entry, and any other labeling requirements related to safe use.

(f) The agricultural employer shall assure that:

(i) Workers wear the personal protective equipment correctly for its intended purpose and use personal protective equipment according to manufacturer's instructions.

(ii) Before each day of use, all personal protective equipment is inspected for leaks, holes, tears, or worn places, and any damaged equipment is repaired or discarded.

(iii) Personal protective equipment that cannot be cleaned properly is disposed of in accordance with any applicable federal, state, and local regulations.

(iv) All personal protective equipment is cleaned according to manufacturer's instructions or pesticide product labeling instructions before each day of reuse. In the absence of any such instructions, it shall be washed thoroughly in detergent and hot water.

(v) Before being stored, all clean personal protective equipment is dried thoroughly or is put in a well-ventilated place to dry.

(vi) Personal protective equipment contaminated with pesticides is kept separately and washed separately from any other clothing or laundry.

(vii) Any person who cleans or launders personal protective equipment is informed that such equipment may be contaminated with pesticides, of the potentially harmful effects of exposure to pesticides, and of the correct way(s) to handle and clean personal protective equipment and to protect themselves when handling equipment contaminated with pesticides.

(viii) All clean personal protective equipment is stored separately from personal clothing and apart from pesticide-contaminated areas.

(ix) Each worker is instructed how to put on, use, and remove the personal protective equipment and is informed about the importance of washing thoroughly after removing personal protective equipment.

(x) Each worker is instructed in the prevention, recognition, and first aid treatment of heat-related illness.

(xi) Workers have a clean place(s) away from pesticide-storage and pesticide-use areas for storing personal clothing not in use; putting on personal protective equipment at the start of any exposure period; and removing personal protective equipment at the end of any exposure period.

(g) When personal protective equipment is required by the labeling of any pesticide for early entry, the agricultural employer shall assure that no worker is allowed or directed to perform the early entry activity without implementing, when appropriate, measures to prevent heat-related illness.

(h) During any early entry activity, the agricultural employer shall provide a decontamination site in accordance with WAC 296-306A-12050.

(i) The agricultural employer shall not allow or direct any worker to wear home or to take home personal protective equipment contaminated with pesticides.

(4) Declaration of an agricultural emergency.

(a) The director of the Washington state department of agriculture may declare the existence of circumstances causing an agricultural emergency on a particular establishment or establishments.

(b) The director may declare an agricultural emergency based on the reasonably expected certainty of circumstances occurring based on weather or other forecasts that would create conditions that would normally be anticipated to cause an agricultural emergency.

(c) The agricultural employer may determine if the establishment under his/her control is subject to the agricultural emergency declared by the director.

(d) Emergency repair of equipment that is in use and sited within a pesticide treated area under a restricted-entry interval, such as frost protection devices, shall be considered to be an agricultural emergency. The conditions in WAC 16-228-655 shall be met.

(e) Activities that require immediate response such as fire suppression, relocation of greenhouse plants due to power failure, and similar conditions, shall be considered to be agricultural emergencies. The conditions in WAC 16-228-655 shall be met.

(5) Agricultural activities permitted under an agricultural emergency.

(a) A worker may enter a pesticide treated area under a restricted-entry interval in an agricultural emergency to perform tasks, including hand labor tasks, necessary to mitigate the effects of the agricultural emergency if the agricultural employer assures that all the following requirements are met:

(i) No entry is permitted for the first four hours after the pesticide application or the minimum reentry interval allowed by EPA for that product, whichever is less;

(ii) The personal protective equipment specified on the product labeling for early entry is provided to the worker;

(iii) The agricultural employer shall assure that the worker, before entering the treated area, either has read the product labeling or has been informed, in a manner the worker can understand, of all labeling requirements related to human hazards or precautions, first aid, symptoms of poisoning, personal protective equipment specified for early entry, and any other labeling requirements related to safe use;

(iv) The agricultural employer shall assure that the worker wears the proper PPE and that the PPE is in operable condition and that the worker has been trained in its proper use;

(v) The agricultural employer shall assure that measures have been taken, when appropriate, to prevent heat-related illness;

(vi) A decontamination site has been provided in accordance with EPA regulations;

(vii) The agricultural employer shall not allow or direct any worker to wear home or take home personal protective equipment contaminated with pesticides.

(b) If the agricultural emergency is due to equipment failure, then the agricultural employer shall assure that all the requirements in subsection (1) of this section are met plus the following additional requirement. The only permitted activity until the restricted-entry interval has elapsed is equipment repair that would mitigate the effect of the equipment failure.

(6) Recordkeeping required for agricultural emergencies.

(a) If the employer declares that his/her establishment is affected by an agricultural emergency and that activities regulated by the worker protection standard have been performed, the employer shall keep the following records for seven years from the date of the agricultural emergency:

(i) Date of the agricultural emergency;

(ii) Time of the agricultural emergency, start and end;

(iii) Reason for the agricultural emergency, such as frost, fire, equipment failure, etc.;

(iv) Crop/site;

(v) Pesticide(s) - name, EPA number, REI;

(vi) Name, date, time of entry and exit of early entry person(s);

(vii) Estimated potential of economic loss which would have occurred had no early entry been allowed.

(b) Records shall be completed within twenty-four hours of the early entry exposure and be available to the department and/or department of health and/or medical facility or treating physician if requested by the above or the employee.

(7) Exception to entry restrictions requiring EPA approval. EPA may in accordance with 40 CFR, Part 170.112(e) grant an exception from the requirements of this section. A request for an exception must be submitted to the Director, Office of Pesticide Programs (H-7501C), Environmental Protection Agency, 401 "M" Street SW, Washington, DC 20460 and must be accompanied by two copies of the information specified in 40 CFR, Part 170.112(e).

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-20-082, § 296-306A-12020, filed 9/30/96, effective 11/1/96.]

WAC 296-306A-12025 Notice of applications—Standards for workers—40 CFR, § 170.120. (1) Notification to workers of pesticide applications in greenhouses. The agricultural employer shall notify workers of any pesticide application in the greenhouse in accordance with this subsection.

(a) All pesticide applications shall be posted in accordance with subsection (3) of this section.

(b) If the pesticide product labeling has a statement requiring both the posting of treated areas and oral notification to workers, the agricultural employer shall also provide oral notification of the application to the worker in accordance with subsection (4) of this section.

(c) Notice need not be given to a worker if the agricultural employer can assure that one of the following is met:

(i) From the start of the application until the end of the application and during any restricted-entry interval, the worker will not enter, work in, remain in, or pass through the greenhouse; or

(ii) The worker applied (or supervised the application of) the pesticide for which the notice is intended and is aware of all information required by subsection (4)(a) through (c) of this section.

(2) Notification to workers on farms, in nurseries, or in forests of pesticide applications. The agricultural employer shall notify workers of any pesticide application on the farm or in the nursery or forest in accordance with this subsection.

(a) If the pesticide product labeling has a statement requiring both the posting of treated areas and oral notification to workers, the agricultural employer shall post signs in accordance with subsection (3) of this section and shall provide oral notification of the application to the worker in accordance with subsection (4) of this section.

(b) For any pesticide other than those for which the labeling requires both posting and oral notification of applications, the agricultural employer shall give notice of the application to the worker either by the posting of warning signs in accordance with subsection (3) of this section or orally in accordance with subsection (4) of this section, and shall inform the workers as to which method of notification is in effect.

(c) Notice need not be given to a worker if the agricultural employer can assure that one of the following is met:

(i) From the start of the application until the end of the application and during any restricted-entry interval, the worker will not enter, work in, remain in, or pass through on foot the treated area or any area within one-quarter mile of the treated area; or

(ii) The worker applied (or supervised the application of) the pesticide for which the notice is intended and is aware of all information required by subsection (4)(a) through (c) of this section.

(3) Posted warning signs. The agricultural employer shall post warning signs in accordance with the following criteria:

(a) The warning sign shall have a background color that contrasts with red. The words "DANGER" and "PELIGRO," plus "PESTICIDES" and "PESTICIDAS," shall be at the top of the sign, and the words "KEEP OUT" and "NO ENTRE" shall be at the bottom of the sign. Letters for all words must be clearly legible. A circle containing an upraised hand on the left and a stern face on the right must be near the center of the sign. The inside of the circle must be red, except that the hand and a large portion of the face must be in a shade that contrasts with red. The length of the hand must be at least twice the height of the smallest letters. The length of the face must be only slightly smaller than the hand. Additional information such as the name of the pesticide and the date of application may appear on the warning sign if it does not detract from the appearance of the sign or change the meaning of the required information. A black and white example of a warning sign meeting these requirements, other than the size requirements, follows:



(b) The standard sign shall be at least fourteen inches by sixteen inches with letters at least one inch in height. Farms and forests shall use the standard size sign unless a smaller sign is necessary because the treated area is too small to accommodate a sign of this size. In nurseries and greenhouses, the agricultural employer may, at any time, use a sign smaller than the standard size sign. Whenever a small sign is used on any establishment, there are specific posting distances depending on the size of the lettering and symbol on the sign. If a sign is used with DANGER and PELIGRO in letters at least 7/8 inch in height and the remaining letters at least 1/2 inch and a red circle at least three inches in diameter containing an upraised hand and a stern face, the signs shall be no further than fifty feet apart. If a sign is used with DANGER and PELIGRO in letters at least 7/16 inch in height and the remaining letters at least 1/4 inch in height and a red circle at least 1 1/2 inches in diameter containing an upraised hand and stern face, the signs shall be no further than twenty-five feet apart. A sign with DANGER and PELIGRO in letters less than 7/16 inch in height or with any words in letters less than 1/4 inch in height, or a red circle smaller than 1 1/2 inches in diameter containing an upraised hand and a stern face will not satisfy the requirements of the rule. All signs must meet the requirements of (a) of this subsection.

(c) The employer may replace the Spanish portion of the warning sign with a non-English language read by the largest group of workers who do not read English. The replacement sign must be in the same format as the original sign and must be visible and legible.

(d) On farms and in forests and nurseries, the signs shall be visible from all usual points of worker entry to the treated area, including at least each access road, each border with any labor camp adjacent to the treated area, and each footpath and other walking route that enters the treated area. When there are no usual points of worker entry, signs shall be posted in the corners of the treated area or in any other location affording maximum visibility.

(e) In greenhouses, the signs shall be posted so they are visible from all usual points of worker entry to the treated area including each aisle or other walking route that enters the treated area. When there are no usual points of worker entry to the treated area, signs shall be posted in the corners of the treated area or in any other location affording maximum visibility.

(f) The signs shall:

(i) Be posted no sooner than twenty-four hours before the scheduled application of the pesticide.

(ii) Remain posted throughout the application and any restricted-entry interval.

(iii) Be removed within three days after the end of the application and any restricted-entry interval and before agricultural-worker entry is permitted, other than entry permitted by WAC 296-306A-12020.

(g) The signs shall remain visible and legible during the time they are posted.

(h) When several contiguous areas are to be treated with pesticides on a rotating or sequential basis, the entire area may be posted. Worker entry, other than entry permitted by WAC 296-306A-12020, is prohibited for the entire area while the signs are posted.

(4) Oral warnings. The agricultural employer shall provide oral warnings to workers in a manner that the worker can understand. If a worker will be on the premises during the application, the warning shall be given before the application takes place. Otherwise, the warning shall be given at the beginning of the worker's first work period during which the application is taking place or the restricted-entry interval for the pesticide is in effect. The warning shall consist of:

(a) The location and description of the treated area.

(b) The time during which entry is restricted.

(c) Instructions not to enter the treated area until the restricted-entry interval has expired.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-20-082, § 296-306A-12025, filed 9/30/96, effective 11/1/96.]

WAC 296-306A-12030 Providing specific information about applications—Standards for workers—40 CFR, § 170.122. When workers are on an agricultural establishment and, within the last thirty days, a pesticide covered by this part has been applied on the establishment or a restricted-entry interval has been in effect, the agricultural employer shall display, in accordance with this section, specific information about the pesticide.

(1) Location, accessibility, and legibility. The information shall be displayed in the location specified in the pesticide safety poster in WAC 296-306A-12045(4) and shall be accessible and legible, as specified in WAC 296-306A-12045 (4) and (6).

(2) Timing.

(a) If warning signs are posted for the treated area before an application, the specific application information for that application shall be posted at the same time or earlier.

(b) The information shall be posted before the application takes place, if workers will be on the establishment during application. Otherwise, the information shall be posted at the beginning of any worker's first work period.

(c) The information shall continue to be displayed for at least thirty days after the end of the restricted-entry interval (or, if there is no restricted-entry interval, for at least thirty days after the end of the application) or at least until workers are no longer on the establishment, whichever is earlier.

(3) Required information. The information shall include:

(a) The location and description of the treated area.

(b) The product name, EPA registration number, and active ingredient(s) of the pesticide.

(c) The time and date the pesticide is to be applied.

(d) The restricted-entry interval for the pesticide.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-20-082, § 296-306A-12030, filed 9/30/96, effective 11/1/96.]

WAC 296-306A-12035 Notice of applications to handler employers—Standards for workers—40 CFR, § 170.124. Whenever handlers who are employed by a commercial pesticide handling establishment will be performing pesticide handling tasks on an agricultural establishment, the agricultural employer shall provide to the handler employer, or assure that the handler employer is aware of, the following information concerning any areas on the agricultural establishment that the handler may be in (or may

walk within one-quarter mile of) and that may be treated with a pesticide or that may be under a restricted-entry interval while the handler will be on the agricultural establishment:

- (1) Specific location and description of any such areas; and
- (2) Restrictions on entering those areas.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-20-08, § 296-306A-12035, filed 9/30/96, effective 11/1/96.]

WAC 296-306A-12040 Pesticide safety training—Standards for workers—40 CFR, § 170.130. (1) General requirement.

(a) Agricultural employer assurance. The agricultural employer shall assure that each worker, required by this section to be trained, has been trained according to this section during the last five years, counting from the end of the month in which the training was completed.

Note: In addition to the training required by this section, the agricultural employer shall assure without exception, that all employees are trained in accordance with WAC 296-62-054 through 296-62-05427, Hazard communication.

(b) Requirement for workers performing early entry activities. Before a worker enters a treated area on the agricultural establishment during a restricted-entry interval to perform early entry activities permitted by WAC 296-306A-12020 and contacts anything that has been treated with the pesticide to which the restricted-entry interval applies, including but not limited to, soil, water, or surfaces of plants, the agricultural employer shall assure that the worker has been trained.

(c) Requirements for other agricultural workers.

(i) Information before entry. Except as provided in (b) of this subsection, before a worker enters any areas on the agricultural establishment where, within the last thirty days a pesticide to which this part applies has been applied or the restricted-entry interval for such pesticide has been in effect, the agricultural employer shall assure that the worker has been provided the pesticide safety information specified in subsection (3) of this section, in a manner that agricultural workers can understand, such as by providing written materials or oral communication or by other means. The agricultural employer must be able to verify compliance with this requirement.

(ii) Training before the start of a work period. The agricultural employer shall assure that a worker has been trained before the worker enters any areas on the agricultural establishment where, within the last thirty days a pesticide to which this chapter applies has been applied or a restricted-entry interval for such pesticide has been in effect, the agricultural employer shall assure that the worker has been trained.

(2) Exceptions. The following persons need not be trained under this section:

(a) A worker who is currently certified as an applicator of restricted-use pesticides under chapter 17.21 RCW.

(b) A worker who satisfies the training requirements of chapter 17.21 RCW.

(c) A worker who satisfies the handler training requirements of WAC 296-306A-13025(3).

(d) A worker who is certified or licensed as a crop advisor by the Washington state department of agriculture under RCW 15.58.230: *Provided*, That a requirement for such certification or licensing is pesticide safety training that includes all the information set out in WAC 296-306A-13025 (3)(d).

(3) Pesticide safety information. The pesticide safety information required by subsection (1)(c)(i) of this section shall be presented to workers in a manner that the workers can understand. At a minimum, the following information shall be provided:

(a) Pesticides may be on or in plants, soil, irrigation water, or drifting from nearby applications.

(b) Prevent pesticides from entering your body by:

(i) Following directions and/or signs about keeping out of treated or restricted areas.

(ii) Washing before eating, drinking, using chewing gum or tobacco, or using the toilet.

(iii) Wearing work clothing that protects the body from pesticide residues.

(iv) Washing/showering with soap and water, shampoo hair, and put on clean clothes after work.

(v) Washing work clothes separately from other clothes before wearing them again.

(vi) Washing immediately in the nearest clean water if pesticides are spilled or sprayed on the body. As soon as possible, shower, shampoo, and change into clean clothes.

(4) Training programs.

(a) General pesticide safety information shall be presented to workers either orally from written materials or audiovisually. The information must be presented in a manner that the workers can understand (such as through a translator) using nontechnical terms. The presenter also shall respond to workers' questions.

(b) The person who conducts the training shall meet at least one of the following criteria:

(i) Be currently certified as an applicator of restricted-use pesticides under chapter 17.21 RCW; or

(ii) Be currently designated as a trainer of certified applicators or pesticide handlers by the Washington state department of agriculture in accordance with chapters 15.58 and 17.21 RCW; or

(iii) Have completed a pesticide safety train-the-trainer program approved by the Washington state department of agriculture in accordance with chapters 15.58 and 17.21 RCW; or

(iv) Satisfy the training requirements in WAC 296-306A-13025(3).

(c) Any person who issues a Washington state department of agriculture-approved Worker Protection Standard worker training card must assure that the worker who receives the training card has been trained in accordance with subsection (4)(d) of this section.

(d) The training materials shall convey, at a minimum, the following information:

(i) Where and in what form pesticides may be encountered during work activities.

(ii) Hazards of pesticides resulting from toxicity and exposure, including acute and chronic effects, delayed effects, and sensitization.

(iii) Routes through which pesticides can enter the body.

(iv) Signs and symptoms of common types of pesticide poisoning.

(v) Emergency first aid for pesticide injuries or poisonings.

(vi) How to obtain emergency medical care.

(vii) Routine and emergency decontamination procedures, including emergency eyeflushing techniques.

(viii) Hazards from chemigation and drift.

(ix) Hazards from pesticide residues on clothing.

(x) Warnings about taking pesticides or pesticide containers home.

(xi) Requirements of this part designed to reduce the risks of illness or injury resulting from workers' occupational exposure to pesticides, including application and entry restrictions, the design of the warning sign, posting of warning signs, oral warnings, the availability of specific information about applications, and the protection against retaliatory acts.

(5) Verification of training.

(a) Except as provided in subsection (5)(b) of this section, if the agricultural employer assures that a worker possesses a Washington state department of agriculture-approved Worker Protection Standard worker training card, then the requirements of subsection (1) of this section will have been met.

(b) If the agricultural employer is aware or has reason to know that a Washington state department of agriculture-approved Worker Protection Standard worker training card has not been issued in accordance with this section, or has not been issued to the worker bearing the card, or the training was completed more than five years before the beginning of the current month, a worker's possession of that certificate does not meet the requirements of subsection (1) of this section.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-20-082, § 296-306A-12040, filed 9/30/96, effective 11/1/96.]

WAC 296-306A-12045 Posted pesticide safety information—Standards for workers—40 CFR, § 170.135.

(1) Requirement. When workers are on an agricultural establishment and, within the last thirty days, a pesticide covered by this part has been applied on the establishment or a restricted-entry interval has been in effect, the agricultural employer shall display, in accordance with this section, pesticide safety information.

(2) Pesticide safety poster. A safety poster must be displayed that conveys, at a minimum, the following basic pesticide safety concepts:

(a) Help keep pesticides from entering your body. At a minimum, the following points shall be conveyed:

(i) Avoid getting on your skin or into your body any pesticides that may be on plants and soil, in irrigation water, or drifting from nearby applications.

(ii) Wash before eating, drinking, using chewing gum or tobacco, or using the toilet.

(iii) Wear work clothing that protects the body from pesticide residues (long-sleeved shirts, long pants, shoes and socks, and a hat or scarf).

(iv) Wash/shower with soap and water, shampoo hair, and put on clean clothes after work.

(v) Wash work clothes separately from other clothes before wearing them again.

(vi) Wash immediately in the nearest clean water if pesticides are spilled or sprayed on the body. As soon as possible, shower, shampoo, and change into clean clothes.

(vii) Follow directions about keeping out of treated or restricted areas.

(b) There are federal rules to protect workers and handlers, including a requirement for safety training.

(3) Emergency medical care information.

(a) The name, address, and telephone number of the nearest emergency medical care facility shall be on the safety poster or displayed close to the safety poster.

(b) The agricultural employer shall inform workers promptly of any change to the information on emergency medical care facilities.

(4) Location.

(a) The information shall be displayed in a central location on the farm or in the nursery or greenhouse where it can be readily seen and read by workers.

(b) The information shall be displayed in a location in or near the forest in a place where it can be readily seen and read by workers and where workers are likely to congregate or pass by, such as at a decontamination site or an equipment storage site.

(5) Accessibility. Workers shall be informed of the location of the information and shall be allowed access to it.

(6) Legibility. The information shall remain legible during the time it is posted.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-20-082, § 296-306A-12045, filed 9/30/96, effective 11/1/96.]

WAC 296-306A-12050 Decontamination—Standards for workers—40 CFR, § 170.150.

(1) Requirements. The agricultural employer must provide decontamination supplies for workers in accordance with this section whenever:

(a) Any worker on the agricultural establishment is performing an activity in the area where a pesticide was applied or a restricted-entry interval (REI) was in effect within the last thirty days; and

(b) The worker contacts anything that has been treated with the pesticide including but not limited to soil, water, plants, plant surfaces, and plant parts;

(c) *Exception.* The thirty-day time period established in (a) of this subsection shall not apply if the only pesticides used in the treated area are products with an REI of four hours or less on the label (but not a product without an REI on the label). When workers are in such treated areas, the agricultural employer shall provide decontamination supplies for not less than seven days following the expiration of any applicable REI.

(2) General conditions.

(a) The agricultural employer shall provide workers with adequate water for routine washing and emergency eyeflushing. At all times when the water is available to workers, the employer shall assure that it is of a quality and temperature that will not cause illness or injury when it contacts the skin or eyes or if it is swallowed.

(b) When water stored in a tank is to be used for mixing pesticides, it shall not be used for decontamination or eyeflushing, unless the tank is equipped with properly

functioning valves or other mechanisms that prevent movement of pesticides into the tank.

(c) The agricultural employer shall provide soap and single-use towels in quantities sufficient to meet workers' needs.

(d) To provide for emergency eyeflushing, the agricultural employer shall assure that at least one pint of water is immediately available to each worker who is performing early entry activities permitted by WAC 296-306A-12020 and for which the pesticide labeling requires protective eyewear. The eyeflush water shall be carried by the early entry worker, or shall be on the vehicle the early entry worker is using, or shall be otherwise immediately accessible.

(3) Location.

(a) The decontamination supplies shall be located together and shall be reasonably accessible to and not more than one-quarter mile from where workers are working.

(b) For worker activities performed more than one-quarter mile from the nearest place of vehicular access:

(i) The soap, single-use towels, and water may be at the nearest place of vehicular access.

(ii) The agricultural employer may permit workers to use clean water from springs, streams, lakes, or other sources for decontamination at the remote work site, if such water is more accessible than the water located at the nearest place of vehicular access.

(c) The decontamination supplies shall not be in an area being treated with pesticides.

(d) The decontamination supplies shall not be maintained in an area that is under a restricted-entry interval, unless the workers for whom the decontamination supplies are provided are performing early entry activities permitted by WAC 296-306A-12020 and involving contact with treated surfaces and the decontamination supplies would otherwise not be reasonably accessible to those workers.

(4) Decontamination after early entry activities. At the end of any exposure period for workers engaged in early entry activities permitted by WAC 296-306A-12020 and involving contact with anything that has been treated with the pesticide to which the restricted-entry interval applies, including, but not limited to, soil, water, air, or surfaces of plants, the agricultural employer shall provide, at the site where the workers remove personal protective equipment, soap, clean towels, and an adequate amount of water so that the workers may wash thoroughly. At least ten gallons of water for one employee and twenty gallons of water for two or more employees shall be provided at early entry sites that do not have running water.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-20-082, § 296-306A-12050, filed 9/30/96, effective 11/1/96.]

WAC 296-306A-12055 Emergency assistance—Standards for workers—40 CFR, § 170.160. If there is reason to believe that a person who is or has been employed on an agricultural establishment to perform tasks related to the production of agricultural plants has been poisoned or injured by exposure to pesticides used on the agricultural establishment, including, but not limited to, exposures from application, splash, spill, drift, or pesticide residues, the agricultural employer shall:

(1) Make available to that person prompt transportation from the agricultural establishment, including any labor camp on the agricultural establishment, to an appropriate emergency medical facility.

(2) Provide to that person or to treating medical personnel, promptly upon request, any obtainable information on:

(a) Product name, EPA registration number, and active ingredients of any product to which that person might have been exposed.

(b) Antidote, first aid, and other medical information from the product labeling.

(c) The circumstances of application or use of the pesticide on the agricultural establishment.

(d) The circumstances of exposure of that person to the pesticide.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-20-082, § 296-306A-12055, filed 9/30/96, effective 11/1/96.]

STANDARD FOR PESTICIDE HANDLERS

WAC 296-306A-130 Applicability of this section—Standards for pesticide handlers—40 CFR, § 170.202. (1) Requirement. Except as provided by subsection (2) of this section, WAC 296-306A-130 applies when any pesticide is handled for use on an agricultural establishment.

(2) Exceptions. WAC 296-306A-130 does not apply when any pesticide is handled for use on an agricultural establishment in the following circumstances:

(a) For mosquito abatement, Mediterranean fruit fly eradication, or similar wide-area public pest control programs sponsored by governmental entities.

(b) On livestock or other animals, or in or about animal premises.

(c) On plants grown for other than commercial or research purposes, which may include plants in habitations, home fruit and vegetable gardens, and home greenhouses.

(d) On plants that are in ornamental gardens, parks, and public or private lawns and grounds and that are intended only for aesthetic purposes or climatic modification.

(e) In a manner not directly related to the production of agricultural plants, including, but not limited to, structural pest control, control of vegetation along rights-of-way and in other noncrop areas, and pasture and rangeland use.

(f) For control of vertebrate pests.

(g) As attractants or repellents in traps.

(h) On the harvested portions of agricultural plants or on harvested timber.

(i) For research uses of unregistered pesticides.

(j) Exemptions. Except as provided by WAC 296-306A-130 and 296-306A-13005, WAC 296-306A-130 applies when a pesticide is handled for an agricultural establishment.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-20-082, § 296-306A-130, filed 9/30/96, effective 11/1/96.]

WAC 296-306A-13005 Exemptions—Standards for handlers—40 CFR, § 170.204. The handlers listed in this section are exempt from the specified provisions of this part.

(1) Owners of agricultural establishments.

(a) The owner of an agricultural establishment is not required to provide to himself or members of his immediate

family who are performing handling tasks on their own agricultural establishment the protections of:

- (i) WAC 296-306A-13010 (2) and (3).
- (ii) WAC 296-306A-13015.
- (iii) WAC 296-306A-13025.
- (iv) WAC 296-306A-13030.
- (v) WAC 296-306A-13035.
- (vi) WAC 296-306A-13040.
- (vii) WAC 296-306A-13045 (5) through (7).
- (viii) WAC 296-306A-13050.
- (ix) WAC 296-306A-13055.

(b) The owner of the agricultural establishment must provide the protections listed in subsection (1)(a)(i) through (ix) of this section to other handlers and other persons who are not members of his immediate family.

(2) Crop advisors.

(a) Provided that the conditions of (b) of this subsection are met, a person who is certified or licensed as a crop advisor by the Washington state department of agriculture under RCW 15.58.230, and persons performing crop advising tasks under such qualified crop advisor's direct supervision, are exempt from the provisions of:

- (i) WAC 296-306A-13030.
- (ii) WAC 296-306A-13045.
- (iii) WAC 296-306A-13050.
- (iv) WAC 296-306A-13055.

A person is under the direct supervision of a crop advisor when the crop advisor exerts the supervisory controls set out in (b)(iv) and (v) of this subsection. Direct supervision does not require that the crop advisor be physically present at all times, but the crop advisor must be readily accessible to the employees at all times.

(b) Conditions of exemption.

(i) The certification or licensing program requires pesticide safety training that includes, at least, all the information in WAC 296-306A-13025 (3)(d).

(ii) No entry into the treated area occurs until after application ends.

(iii) Applies only when performing crop advising tasks in the treated area.

(iv) The crop advisor must make specific determinations regarding the appropriate PPE, appropriate decontamination supplies, and how to conduct the tasks safely. The crop advisor must convey this information to each person under his direct supervision in a language that the person understands.

(v) Before entering a treated area, the certified or licensed crop advisor must inform, through an established practice of communication, each person under his direct supervision of the pesticide products and active ingredient(s) applied, method of application, time of application, the restricted-entry interval, which tasks to undertake, and how to contact the crop advisor.

(c) Applies only when the persons are performing crop advising tasks in the treated area.

(d) The crop advisor must make specific determinations regarding the appropriate PPE, appropriate decontamination supplies, and how to conduct the tasks safely. The crop advisor must convey this information to each person under his direct supervision in a language that the person understands.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-20-082, § 296-306A-13005, filed 9/30/96, effective 11/1/96.]

WAC 296-306A-13010 Restrictions during applications—Standards for pesticide handlers—40 CFR, § 170.210. (1) Contact with workers and other persons. The handler employer and the handler shall assure that no pesticide is applied so as to contact, either directly or through drift, any worker or other person, other than an appropriately trained and equipped handler.

(2) Handlers handling highly toxic pesticides. The handler employer shall assure that any handler who is performing any handling activity with a product that has the skull and crossbones symbol on the front panel of the label is monitored visually or by voice communication at least every two hours.

(3) Fumigant applications in greenhouses. The handler employer shall assure:

(a) That any handler who handles a fumigant in a greenhouse, including a handler who enters the greenhouse before the acceptable inhalation exposure level or ventilation criteria have been met to monitor air levels or to initiate ventilation, maintains continuous visual or voice contact with another handler.

(b) That the other handler has immediate access to the personal protective equipment required by the fumigant labeling for handlers in the event entry into the fumigated greenhouse becomes necessary for rescue.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-20-082, § 296-306A-13010, filed 9/30/96, effective 11/1/96.]

WAC 296-306A-13015 Providing specific information about applications—Standards for pesticide handlers—40 CFR, § 170.222. When handlers (except those employed by a commercial pesticide handling establishment) are on an agricultural establishment and, within the last thirty days, a pesticide covered by this part has been applied on the establishment or a restricted-entry interval has been in effect, the handler employer shall display, in accordance with this section, specific information about the pesticide.

(1) Location, accessibility, and legibility. The information shall be displayed in the same location specified for the pesticide safety poster in WAC 296-306A-13040(4) and shall be accessible and legible, as specified in WAC 296-306A-13040 (5) and (6).

(2) Timing.

(a) If warning signs are posted for the treated area before an application, the specific application information for that application shall be posted at the same time or earlier.

(b) The information shall be posted before the application takes place, if handlers (except those employed by a commercial pesticide handling establishment) will be on the establishment during application. Otherwise, the information shall be posted at the beginning of any such handler's first work period.

(c) The information shall continue to be displayed for at least thirty days after the end of the restricted-entry interval (or, if there is no restricted-entry interval, for at least thirty days after the end of the application) or at least until the handlers are no longer on the establishment, whichever is earlier.

(3) Required information. The information shall include:

- (a) The location and description of the treated area.
- (b) The product name, EPA registration number, and active ingredient(s) of the pesticide.
- (c) The time and date the pesticide is to be applied.
- (d) The restricted-entry interval for the pesticide.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-20-082, § 296-306A-13015, filed 9/30/96, effective 11/1/96.]

WAC 296-306A-13020 Notice of applications to agricultural employers—Standards for pesticide handlers—40 CFR, § 170.224. Before the application of any pesticide on or in an agricultural establishment, the handler employer shall provide the following information to any agricultural employer for the establishment or shall assure that any agricultural employer is aware of:

- (1) Specific location and description of the treated area.
- (2) Time and date of application.
- (3) Product name, EPA registration number, and active ingredient(s).
- (4) Restricted-entry interval.
- (5) Whether posting and oral notification are required.
- (6) Any other product-specific requirements on the product labeling concerning protection of workers or other persons during or after application.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-20-082, § 296-306A-13020, filed 9/30/96, effective 11/1/96.]

WAC 296-306A-13025 Pesticide safety training—Standards for pesticide handlers—40 CFR, § 170.230. (1) Requirement. Before any handler performs any handling task, the handler employer shall assure that the handler has been trained in accordance with this section during the last five years, counting from the end of the month in which the training was completed.

Note: In addition to the training required by this section, the agricultural employer shall assure, without exception, that all employees are trained in accordance with WAC 296-62-054 through 296-62-05427, Hazard communication.

(2) Exceptions. The following persons need not be trained under this section:

- (a) A handler who is currently certified as an applicator of restricted-use pesticides under chapter 17.21 RCW.
- (b) A handler who is certified or licensed as a crop advisor by the Washington state department of agriculture under RCW 15.58.230: *Provided*, That a requirement for such certification or licensing is pesticide safety training that includes all the information set out in WAC 296-306A-13025 (3)(d).

(3) Training programs.

(a) General pesticide safety information shall be presented to handlers either orally from written materials or audiovisually. The information must be presented in a manner that the handlers can understand (such as through a translator). The presenter also shall respond to handlers' questions.

(b) The person who conducts the training shall meet at least one of the following criteria:

- (i) Be currently certified as an applicator of restricted-use pesticides under chapter 17.21 RCW; or

(ii) Be currently designated as a trainer of certified applicators or pesticide handlers by the Washington state department of agriculture under chapters 15.58 or 17.21 RCW; or

(iii) Have completed a pesticide safety train-the-trainer program approved by a state, federal, or tribal agency having jurisdiction.

(c) Any person who issues a Washington state department of agriculture-approved Worker Protection Standard handler training card must assure that the handler who receives the training card has been trained in accordance with (d) of this subsection.

(d) The pesticide safety training materials must convey, at a minimum, the following information:

(i) Format and meaning of information contained on pesticide labels and in labeling, including safety information such as precautionary statements about human health hazards.

(ii) Hazards of pesticides resulting from toxicity and exposure, including acute and chronic effects, delayed effects, and sensitization.

(iii) Routes by which pesticides can enter the body.

(iv) Signs and symptoms of common types of pesticide poisoning.

(v) Emergency first aid for pesticide injuries or poisonings.

(vi) How to obtain emergency medical care.

(vii) Routine and emergency decontamination procedures.

(viii) Need for and appropriate use of personal protective equipment.

(ix) Prevention, recognition, and first-aid treatment of heat-related illness.

(x) Safety requirements for handling, transporting, storing, and disposing of pesticides, including general procedures for spill cleanup.

(xi) Environmental concerns such as drift, runoff, and wildlife hazards.

(xii) Warnings about taking pesticides or pesticide containers home.

(xiii) Requirements of this part that must be followed by handler employers for the protection of handlers and other persons, including the prohibition against applying pesticides in a manner that will cause contact with workers or other persons, the requirement to use personal protective equipment, the provisions for training and decontamination, and the protection against retaliatory acts.

(4) Verification of training.

(a) Except as provided in (b) of this subsection, if the handler employer assures that a handler possesses a Washington state department of agriculture-approved Worker Protection Standard handler training card, then the requirements of subsection (1) of this section will have been met.

(b) If the handler employer is aware or has reason to know that a Washington state department of agriculture-approved Worker Protection Standard handler training card has not been issued in accordance with this section, or has not been issued to the handler bearing the card, or the handler training was completed more than five years before the beginning of the current month, a handler's possession of that card does not meet the requirements of subsection (1) of this section.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-20-082, § 296-306A-13025, filed 9/30/96, effective 11/1/96.]

WAC 296-306A-13030 Knowledge of labeling and site-specific information—Standards for pesticide handlers—40 CFR, § 170.232. (1) Knowledge of labeling information.

(a) The handler employer shall assure that before the handler performs any handling activity, the handler either has read the product labeling or has been informed in a manner the handler can understand of all labeling requirements related to safe use of the pesticide, such as signal words, human hazard precautions, personal protective equipment requirements, first-aid instructions, environmental precautions, and any additional precautions pertaining to the handling activity to be performed.

(b) The handler employer shall assure that the handler has access to the product labeling information during handling activities.

(2) Knowledge of site-specific information. Whenever a handler who is employed by a commercial pesticide handling establishment will be performing pesticide handling tasks on an agricultural establishment, the handler employer shall assure that the handler is aware of the following information concerning any areas on the agricultural establishment that the handler may be in (or may walk within one-quarter mile of) and that may be treated with a pesticide or that may be under a restricted-entry interval while the handler will be on the agricultural establishment:

(a) Specific location and description of any such areas; and

(b) Restrictions on entering those areas.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-20-082, § 296-306A-13030, filed 9/30/96, effective 11/1/96.]

WAC 296-306A-13035 Safe operation of equipment—Standards for pesticide handlers—40 CFR, § 170.234. (1) The handler employer shall assure that before the handler uses any equipment for mixing, loading, transferring, or applying pesticides, the handler is instructed in the safe operation of such equipment, including, when relevant, chemigation safety requirements and drift avoidance.

(2) The handler employer shall assure that, before each day of use, equipment used for mixing, loading, transferring, or applying pesticides is inspected for leaks, clogging, and worn or damaged parts, and any damaged equipment is repaired or is replaced.

(3) Before allowing any person to repair, clean, or adjust equipment that has been used to mix, load, transfer, or apply pesticides, the handler employer shall assure that pesticide residues have been removed from the equipment, unless the person doing the cleaning, repairing, or adjusting is a handler employed by the agricultural or commercial pesticide handling establishment. If pesticide residue removal is not feasible, the handler employer shall assure that the person who repairs, cleans, or adjusts such equipment is informed:

(a) That such equipment may be contaminated with pesticides.

(b) Of the potentially harmful effects of exposure to pesticides.

(c) Of the correct way to handle such equipment.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-20-082, § 296-306A-13035, filed 9/30/96, effective 11/1/96.]

WAC 296-306A-13040 Posted pesticide safety information—Standards for pesticide handlers—40 CFR, § 170.235. (1) Requirement. When handlers (except those employed by a commercial pesticide handling establishment) are on an agricultural establishment and, within the last thirty days, a pesticide covered by this part has been applied on the establishment or a restricted-entry interval has been in effect, the handler employer shall display, in accordance with this section, pesticide safety information.

(2) Pesticide safety poster. A safety poster must be displayed that conveys, at a minimum, the following basic pesticide safety concepts:

(a) Help keep pesticides from entering your body. At a minimum, the following points shall be conveyed:

(i) Avoid getting on your skin or into your body any pesticides that may be on plants and soil, in irrigation water, or drifting from nearby applications.

(ii) Wash before eating, drinking, using chewing gum or tobacco, or using the toilet.

(iii) Wear work clothing that protects the body from pesticide residues (long-sleeved shirts, long pants, shoes and socks, and a hat or scarf).

(iv) Wash/shower with soap and water, shampoo hair, and put on clean clothes after work.

(v) Wash work clothes separately from other clothes before wearing them again.

(vi) Wash immediately in the nearest clean water if pesticides are spilled or sprayed on the body. As soon as possible, shower, shampoo, and change into clean clothes.

(vii) Follow directions about keeping out of treated or restricted areas.

(b) There are federal rules to protect workers and handlers including a requirement for safety training.

(3) Emergency medical care information.

(a) The name, address, and telephone number of the nearest emergency medical care facility shall be on the safety poster or displayed close to the safety poster.

(b) The handler employer shall inform handlers promptly of any change to the information on emergency medical care facilities.

(4) Location.

(a) The information shall be displayed in a central location on the farm or in the nursery or greenhouse where it can be readily seen and read by handlers.

(b) The information shall be displayed in a location in or near the forest in a place where it can be readily seen and read by handlers and where handlers are likely to congregate or pass by, such as at a decontamination site or an equipment storage site.

(5) Accessibility. Handlers shall be informed of the location of the information and shall be allowed access to it.

(6) Legibility. The information shall remain legible during the time it is posted.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-20-082, § 296-306A-13040, filed 9/30/96, effective 11/1/96.]

WAC 296-306A-13045 Personal protective equipment—Standards for pesticide handlers—40 CFR, § 170.240. (1) Requirement. Any person who performs tasks as a pesticide handler shall use the clothing and personal protective equipment specified on the labeling for use of the product.

(2) Definition.

(a) Personal protective equipment (PPE) means devices and apparel that are worn to protect the body from contact with pesticides or pesticide residues, including, but not limited to, coveralls, chemical-resistant suits, chemical-resistant gloves, chemical-resistant footwear, respiratory protection devices, chemical-resistant aprons, chemical-resistant headgear, and protective eyewear.

(b) Long-sleeved shirts, short-sleeved shirts, long pants, short pants, shoes, socks, and other items of work clothing are not considered personal protective equipment for the purposes of this section and are not subject to the requirements of this section, although pesticide labeling may require that such work clothing be worn during some activities.

(3) Provision. When personal protective equipment is specified by the labeling of any pesticide for any handling activity, the handler employer shall provide the appropriate personal protective equipment in clean and operating condition to the handler.

(a) When "chemical-resistant" personal protective equipment is specified by the product labeling, it shall be made of material that allows no measurable movement of the pesticide being used through the material during use.

(b) When "waterproof" personal protective equipment is specified by the product labeling, it shall be made of material that allows no measurable movement of water or aqueous solutions through the material during use.

(c) When a "chemical-resistant suit" is specified by the product labeling, it shall be a loose-fitting, one-piece or two-piece chemical-resistant garment that covers, at a minimum, the entire body except head, hands, and feet.

(d) When "coveralls" are specified by the product labeling, they shall be a loose-fitting, one-piece or two-piece garment, such as a cotton or cotton and polyester coverall, that covers, at a minimum, the entire body except head, hands, and feet. The pesticide product labeling may specify that the coveralls be worn over another layer of clothing.

(e) Gloves shall be of the type specified by the product labeling. Gloves or glove linings made of leather, cotton, or other absorbent material shall not be worn for handling activities unless such materials are listed on the product labeling as acceptable for such use.

(f) When "chemical-resistant footwear" is specified by the product labeling, one of the following types of footwear must be worn:

- (i) Chemical-resistant shoes.
- (ii) Chemical-resistant boots.
- (iii) Chemical-resistant shoe coverings worn over shoes or boots.

(g) When "protective eyewear" is specified by the product labeling, one of the following types of eyewear must be worn:

- (i) Goggles.
- (ii) Face shield.
- (iii) Safety glasses with front, brow, and temple protection.

(iv) Full-face respirator.

(h) When a "chemical-resistant apron" is specified by the product labeling, an apron that covers the front of the body from mid-chest to the knees shall be worn.

(i) When a respirator is specified by the product labeling, it shall be appropriate for the pesticide product used and for the activity to be performed. The handler employer shall assure that the respirator fits correctly by using the procedures consistent with WAC 296-62-071. If the label does not specify the type of respirator to be used, it shall meet the requirements of WAC 296-62-071. The respiratory protection requirements of the general occupational health standards, WAC 296-62-071, shall apply.

(j) When "chemical-resistant headgear" is specified by the product labeling, it shall be either a chemical-resistant hood or a chemical-resistant hat with a wide brim.

(4) Exceptions to personal protective equipment specified on product labeling.

(a) Body protection.

(i) A chemical-resistant suit may be substituted for "coveralls," and any requirement for an additional layer of clothing beneath is waived.

(ii) A chemical-resistant suit may be substituted for "coveralls" and a chemical-resistant apron.

(b) Boots. If chemical-resistant footwear with sufficient durability and a tread appropriate for wear in rough terrain is not obtainable, then leather boots may be worn in such terrain.

(c) Gloves. If chemical-resistant gloves with sufficient durability and suppleness are not obtainable, then during handling activities with roses or other plants with sharp thorns, leather gloves may be worn over chemical-resistant glove liners. However, once leather gloves are worn for this use, thereafter they shall be worn only with chemical-resistant liners and they shall not be worn for any other use.

(d) Closed systems. If handling tasks are performed using properly functioning systems that enclose the pesticide to prevent it from contacting handlers or other persons, and if such systems are used and are maintained in accordance with that manufacturer's written operating instructions, exceptions to labeling-specified personal protective equipment for the handling activity are permitted as provided in (d)(i) and (ii) of this subsection.

(i) Persons using a closed system to mix or load pesticides with a signal word of DANGER or WARNING may substitute a long-sleeved shirt, long pants, shoes, socks, chemical-resistant apron, and any protective gloves specified on the labeling for handlers for the labeling-specified personal protective equipment.

(ii) Persons using a closed system to mix or load pesticides other than those in (d)(i) of this subsection or to perform other handling tasks may substitute a long-sleeved shirt, long pants, shoes, and socks for the labeling-specified personal protective equipment.

(iii) Persons using a closed system that operates under pressure shall wear protective eyewear.

(iv) Persons using a closed system shall have all labeling-specified personal protective equipment immediately available for use in an emergency.

(e) Enclosed cabs. If handling tasks are performed from inside a cab that has a nonporous barrier which totally surrounds the occupants of the cab and prevents contact with

pesticides outside of the cab, exceptions to personal protective equipment specified on the product labeling for that handling activity are permitted as provided in (e)(i) through (iv) of this subsection.

(i) Persons occupying an enclosed cab may substitute a long-sleeved shirt, long pants, shoes, and socks for the labeling-specified personal protective equipment. If a respiratory protection device is specified on the pesticide product labeling for the handling activity, it must be worn.

(ii) Persons occupying an enclosed cab that has a properly functioning ventilation system which is used and maintained in accordance with the manufacturer's written operating instructions and which is declared in writing by the manufacturer and by the Washington state department of labor and industries to provide respiratory protection equivalent to or greater than a dust/mist filtering respirator may substitute a long-sleeved shirt, long pants, shoes, and socks for the labeling-specified personal protective equipment. If a respiratory protection device other than a dust/mist-filtering respirator is specified on the pesticide product labeling, it must be worn.

(iii) Persons occupying an enclosed cab that has a properly functioning ventilation system which is used and maintained in accordance with the manufacturer's written operating instructions and which is declared in writing by the manufacturer and by the Washington state department of labor and industries to provide respiratory protection equivalent to or greater than the vapor-removing or gas-removing respirator specified on pesticide product labeling may substitute a long-sleeved shirt, long pants, shoes, and socks for the labeling-specified personal protective equipment. If an air-supplying respirator or a self-contained breathing apparatus (SCBA) is specified on the pesticide product labeling, it must be worn.

(iv) Persons occupying an enclosed cab shall have all labeling-specified personal protective equipment immediately available and stored in a chemical-resistant container, such as a plastic bag. They shall wear such personal protective equipment if it is necessary to exit the cab and contact pesticide-treated surfaces in the treated area. Once personal protective equipment is worn in the treated area, it must be removed before reentering the cab.

(f) Aerial applications.

(i) Use of gloves. Chemical-resistant gloves shall be worn when entering or leaving an aircraft contaminated by pesticide residues. In the cockpit, the gloves shall be kept in an enclosed container to prevent contamination of the inside of the cockpit.

(ii) Open cockpit. Persons occupying an open cockpit shall use the personal protective equipment specified in the product labeling for use during application, except that chemical-resistant footwear need not be worn. A helmet may be substituted for chemical-resistant headgear. A visor may be substituted for protective eyewear.

(iii) Enclosed cockpit. Persons occupying an enclosed cockpit may substitute a long-sleeved shirt, long pants, shoes, and socks for labeling-specified personal protective equipment.

(g) Crop advisors. Crop advisors entering treated areas while a restricted-entry interval is in effect may wear the personal protective equipment specified on the pesticide labeling for early entry activities instead of the personal

protective equipment specified on the pesticide labeling for handling activities, provided:

(i) Application has been completed for at least four hours.

(ii) Any inhalation exposure level listed in the labeling has been reached or any ventilation criteria established by WAC 296-306A-12015 (3)(c) or in the labeling have been met.

(5) Use of personal protective equipment.

(a) The handler employer shall assure that personal protective equipment is used correctly for its intended purpose and is used according to the manufacturer's instructions.

(b) The handler employer shall assure that, before each day of use, all personal protective equipment is inspected for leaks, holes, tears, or worn places, and any damaged equipment is repaired or discarded.

(6) Cleaning and maintenance.

(a) The handler employer shall assure that all personal protective equipment is cleaned according to the manufacturer's instructions or pesticide product labeling instructions before each day of reuse. In the absence of any such instructions, it shall be washed thoroughly in detergent and hot water.

(b) If any personal protective equipment cannot be cleaned properly, the handler employer shall dispose of the personal protective equipment in accordance with any applicable federal, state, and local regulations. Coveralls or other absorbent materials that have been drenched or heavily contaminated with an undiluted pesticide that has the signal word DANGER or WARNING on the label shall be not be reused.

(c) The handler employer shall assure that contaminated personal protective equipment is kept separately and washed separately from any other clothing or laundry.

(d) The handler employer shall assure that all clean personal protective equipment shall be either dried thoroughly before being stored or shall be put in a well ventilated place to dry.

(e) The handler employer shall assure that all personal protective equipment is stored separately from personal clothing and apart from pesticide-contaminated areas.

(f) The handler employer shall assure that when dust/mist filtering respirators are used, the filters shall be replaced:

(i) When breathing resistance becomes excessive.

(ii) When the filter element has physical damage or tears.

(iii) According to manufacturer's recommendations or pesticide product labeling, whichever is more frequent.

(iv) In the absence of any other instructions or indications of service life, at the end of each day's work period.

(g) The handler employer shall assure that when gas-removing or vapor-removing respirators are used, the gas-removing or vapor-removing canisters or cartridges shall be replaced:

(i) At the first indication of odor, taste, or irritation.

(ii) According to manufacturer's recommendations or pesticide product labeling, whichever is more frequent.

(iii) In the absence of any other instructions or indications of service life, at the end of each day's work period.

(h) The handler employer shall inform any person who cleans or launders personal protective equipment:

(i) That such equipment may be contaminated with pesticides.

(ii) Of the potentially harmful effects of exposure to pesticides.

(iii) Of the correct way(s) to clean personal protective equipment and to protect themselves when handling such equipment.

(i) The handler employer shall assure that handlers have a clean place(s) away from pesticide storage and pesticide use areas where they may:

(i) Store personal clothing not in use.

(ii) Put on personal protective equipment at the start of any exposure period.

(iii) Remove personal protective equipment at the end of any exposure period.

(j) The handler employer shall not allow or direct any handler to wear home or to take home personal protective equipment contaminated with pesticides.

(7) Heat-related illness. When the use of personal protective equipment is specified by the labeling of any pesticide for the handling activity, the handler employer shall assure that no handler is allowed or directed to perform the handling activity unless appropriate measures are taken, if necessary, to prevent heat-related illness.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-20-082, § 296-306A-13045, filed 9/30/96, effective 11/1/96.]

WAC 296-306A-13050 Decontamination—Standards for pesticide handlers—40 CFR, § 170.250. (1) Requirement. During any handling activity, the handler employer shall provide for handlers, in accordance with this section, decontamination supplies for washing off pesticides and pesticide residues.

(2) General conditions.

(a) The handler employer shall provide handlers with enough water for routine washing, for emergency eyeflushing, and for washing the entire body in case of an emergency. At all times when the water is available to handlers, the handler employer shall assure that it is of a quality and temperature that will not cause illness or injury when it contacts the skin or eyes or if it is swallowed. At least ten gallons of water for one employee and twenty gallons of water for two or more employees shall be provided at mixing and loading sites that do not have running water.

(b) When water stored in a tank is to be used for mixing pesticides, it shall not be used for decontamination or eyeflushing, unless the tank is equipped with properly functioning valves or other mechanisms that prevent movement of pesticides into the tank.

(c) The handler employer shall provide soap and single-use towels in quantities sufficient to meet handlers' needs.

(d) The handler employer shall provide one clean change of clothing, such as coveralls for use in an emergency.

(3) Location. The decontamination supplies shall be located together and reasonably accessible to and not more than one-quarter mile from each handler during the handling activity.

(a) Exception for mixing sites. For mixing activities, the decontamination supplies shall be at the mixing site.

(b) Exception for pilots. The decontamination supplies for a pilot who is applying pesticides aerially shall be in the airplane or at the aircraft loading site.

(c) Exception for handling pesticides in remote areas. When handling activities are performed more than one-quarter mile from the nearest place of vehicular access:

(i) The soap, single-use towels, clean change of clothing, and water may be at the nearest place of vehicular access.

(ii) The handler employer may permit handlers to use clean water from springs, streams, lakes, or other sources for decontamination at the remote work site, if such water is more accessible than the water with the decontamination supplies located at the nearest place of vehicular access.

(d) Decontamination supplies in treated areas. The decontamination supplies shall not be in an area being treated with pesticides or in an area under a restricted-entry interval, unless:

(i) The decontamination supplies are in the area where the handler is performing handling activities;

(ii) The soap, single-use towels, and clean change of clothing are in enclosed containers; and

(iii) The water is running tap water or is enclosed in a container.

(4) Emergency eyeflushing. To provide for emergency eyeflushing, the handler employer shall assure that at least one pint of water is immediately available to each handler who is performing tasks for which the pesticide labeling requires protective eyewear. The eyeflush water shall be carried by the handler, or shall be on the vehicle or aircraft the handler is using, or shall be otherwise immediately accessible.

(5) A plumbed or portable emergency eyewash capable of delivering at least 1.5 liters (0.4 gals.) of water per minute for fifteen minutes shall be provided at all pesticide mixing and loading stations or handler decontamination sites when the label requires protective eyewear for mixing, loading or applying. A plumbed or portable system meeting the above requirements shall be provided at all permanent pesticide mixing and loading sites.

(6) Decontamination after handling activities. At the end of any exposure period, the handler employer shall provide at the site where handlers remove personal protective equipment, soap, clean towels, and a sufficient amount of water so that the handlers may wash thoroughly. At least ten gallons of water for one employee and twenty gallons of water for two or more employees shall be provided at mixing and loading sites that do not have running water.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-20-082, § 296-306A-13050, filed 9/30/96, effective 11/1/96.]

WAC 296-306A-13055 Emergency assistance—Standards for pesticide handlers—40 CFR, § 170.260. If there is reason to believe that a person who is or has been employed by an agricultural establishment or commercial pesticide handling establishment to perform pesticide handling tasks has been poisoned or injured by exposure to pesticides as a result of that employment, including, but not limited to, exposures from handling tasks or from applica-

tion, splash, spill, drift, or pesticide residues, the handler employer shall:

(1) Make available to that person prompt transportation from the place of employment or the handling site to an appropriate emergency medical facility.

(2) Provide to that person or to treating medical personnel, promptly upon request, any obtainable information on:

(a) Product name, EPA registration number, and active ingredients of any product to which that person might have been exposed.

(b) Antidote, first aid, and other medical information from the product labeling.

(c) The circumstances of handling of the pesticide.

(d) The circumstances of exposure of that person to the pesticide.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-20-082, § 296-306A-13055, filed 9/30/96, effective 11/1/96.]

Part J Pesticides Recordkeeping

WAC 296-306A-145 Pesticides recordkeeping.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-145, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-14505 What records must an employer keep for pesticide applications? (1) If you apply pesticides, or have pesticides applied for you, related to the production of an agricultural crop, you must keep records for each application. The records must include the following:

(a) The address or exact location where the pesticide was applied or stored;

Note: If you apply pesticides to one acre or more, the location must be shown on the map on the required form for at least the first application.

(b) The year, month, day, and time the pesticide was applied or stored;

(c) The product name on the registered label and the United States Environmental Protection Agency registration number, if applicable, of the pesticide that was applied or stored;

(d) The crop or site to which the pesticide was applied (application crop or site);

(e) The amount of pesticide applied per acre, or other appropriate measure;

(f) The concentration of pesticide applied;

(g) The total area to which pesticide was applied;

(h) If applicable, the licensed applicator's name, address, and telephone number and the name of the individual(s) making the application;

(i) The direction and estimated velocity of the wind at the time the pesticide was applied;

Exception: Wind information does not have to be recorded for applications of baits in bait stations and pesticide applications within structures.

(j) Any other reasonable information required by the department.

(2) A commercial pesticide applicator must provide a copy of the pesticide application records to the owner or

lessee of the lands to which the pesticide is applied. Pesticide application records may be provided on any form that includes all required information.

(3) You must update records on the same day that a pesticide is applied. You may use a copy as the record of the pesticide application. You must maintain the records for at least seven years after the date of the application.

(4) You must ensure that pesticide application records are readily accessible to employees and their designated representatives in a central location in the workplace. The records must be available beginning on the day the application is made and for at least thirty days after. You may view the pesticide application records and make your own record from that information.

(5) New or newly assigned employees must be made aware of the accessibility of the application records before working with pesticides or in an area containing pesticides.

(6) When storing pesticides, you must, at least once a year, perform an inventory of the pesticides stored in any work area.

(7) The pesticide inventory records must include the following information:

(a) The location where the pesticide is stored;

(b) The year, month, day, and time the pesticide was first stored;

(c) The product name used on the registered label and the United States Environmental Protection Agency Registration Number, if applicable, of the pesticide that is stored; and

(d) The amount of pesticide in storage at the time of the inventory.

(8) You must maintain a record of pesticide purchases made between the annual inventory dates.

(a) Instead of this purchase record, you may obtain from distributors from whom you buy pesticides, a statement obligating the distributor to maintain the purchase records on your behalf to meet the requirements of this section.

(b) We may require you to submit all purchase records covering the purchases during a specified period of time or in a specified geographical area.

(9) When you end all pesticide activities, you must file the records with us. Anyone who succeeds or replaces you must retain the records required by this section, but that person is not liable for any violations you commit.

(10) You must ensure that the records required under this section are readily accessible to us for inspection. You must also provide copies of the records on request, to:

(a) An employee or the employee's designated representative in the case of an industrial insurance claim filed under Title 51 RCW with the department of labor and industries;

(b) Treating health care personnel; or

(c) The pesticide incident reporting and tracking review panel.

(11) The designated representative or treating health care personnel are not required to identify the employee represented or treated.

(12) We will keep the name of any affected employee confidential according to RCW 49.17.080(1).

(13) When treating health care personnel request records under this section, and the record is required to determine treatment, you must provide copies of the record immediate-

ly. Information for treating health care personnel must be made immediately available by telephone, if requested, with a copy of the records provided within twenty-four hours. For all other requests, you must provide copies of the records within seventy-two hours.

(14) If requested, you must provide copies of records on a form provided by the department.

(15) If you suspect that an employee is ill or injured because of an exposure to one or more pesticides, you must immediately provide the employee with a copy of the relevant pesticide application records.

(16) If you refuse to provide a copy of a requested record, the requester may notify the department of the request and your refusal.

(a) Within seven working days, we will request that you provide us with all pertinent copies of the records, except that in a medical emergency we will request within two working days.

(b) You must provide copies of the records to us within twenty-four hours after we request.

(17) We inspect for the records required under this section as part of any on-site inspection of a workplace conducted under this chapter or chapter 49.17 RCW. We will determine, during the inspection, whether the records are readily transferable to a form adopted by the department, and readily accessible to employees. However, your records will not be inspected more than once in any calendar year, unless a previous inspection has found recordkeeping violations. If recordkeeping violations are found, we may conduct reasonable multiple inspections, according to department rules. (See WAC 296-27-16018, Compliance inspections, and WAC 296-27-16026, Programmed inspections.) Nothing in this section limits our inspection of records pertaining to pesticide-related injuries, illnesses, fatalities, accidents, or complaints.

(18) If you fail to maintain the records, or provide access to or copies of the records required under this section, you will be subject to penalties authorized under RCW 49.17.180.

(19) The department of labor and industries and the department of agriculture will jointly adopt by rule, forms that satisfy the information requirements of this section and RCW 17.21.100.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-14505, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-14510 What do the pesticides forms look like?

WAC 296-306A-14510 Pesticide application record (version 1).

State of Washington
Department of Agriculture
Olympia, Washington 98504

PESTICIDE APPLICATION RECORD (Version 1)

NOTE: This form must be completed same day as the application
and it must be retained for 7 years. (Ref. RCW 17.21)

- 1. Date of Application - Year: Month: Day: Time:
2. Name of person for whom the pesticide was applied: Firm Name (if applicable): Street Address: City: State: Zip:
3. Licensed Applicator's Name (if different from #2 above): License No.: Firm Name (if applicable): Tel. No.: Street Address: City: State: Zip:
4. Name of person(s) who applied the pesticide (if different than #3 above): License No(s), if applicable:
5. Application Crop or Site:
6. Total Area Treated (acrc., sq. ft., etc):
7. Was this application made as a result of a WSDA Permit? No Yes (if yes, give Permit No.) #.....
8. Pesticide information (please list all information for each pesticide in the tank mix):

Table with 5 columns: a) Product Name, b) EPA Reg No., c) Total Amount of Pesticide Applied in Area Treated, d) Pesticide Applied/Acre (or other measure), e) Concentration Applied. Includes horizontal lines for data entry.

9. Address or exact location of application. NOTE: If the application is made to one acre or more of agricultural land, the field location must be shown on the map on page two of this form.

- 10. Wind direction and estimated velocity during the application:
11. Temperature during the application:
12. Apparatus license plate number (if applicable):
13. Air Ground Chemigation
14. Miscellaneous Information:

Location of Application (if the application covers more than one township or range, please indicate the township & range for the top left section of the map only):

Township:

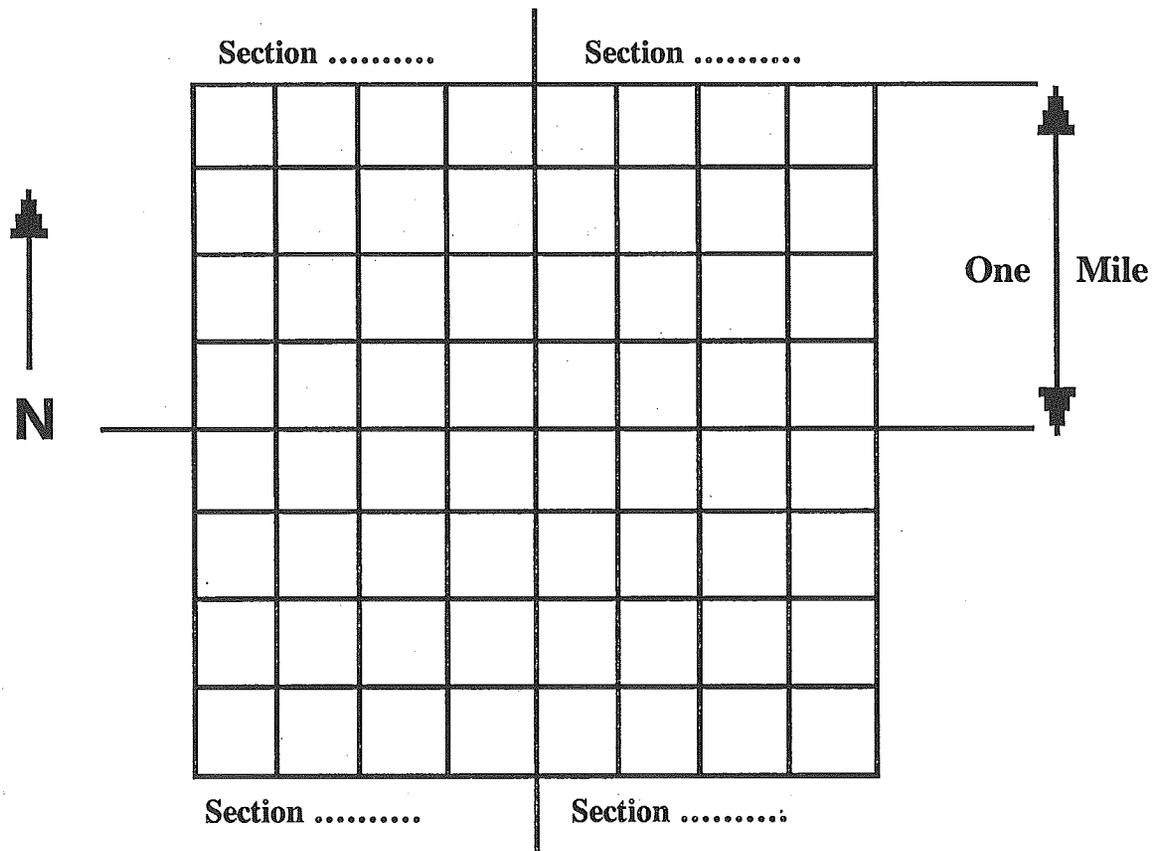
Range: E or W (please indicate)

Section(s):

County:

PLEASE NOTE:

The map is divided into 4 sections with each section divided into quarter-quarter sections. Please complete it by marking the appropriate section number(s) on the map and indicate as accurately as possible the location of the area treated.



Miscellaneous Information:

Location of Application: (If the application covers more than one township or range, please indicate the township & range for the top left section of the map only)

TOWNSHIP: _____ N

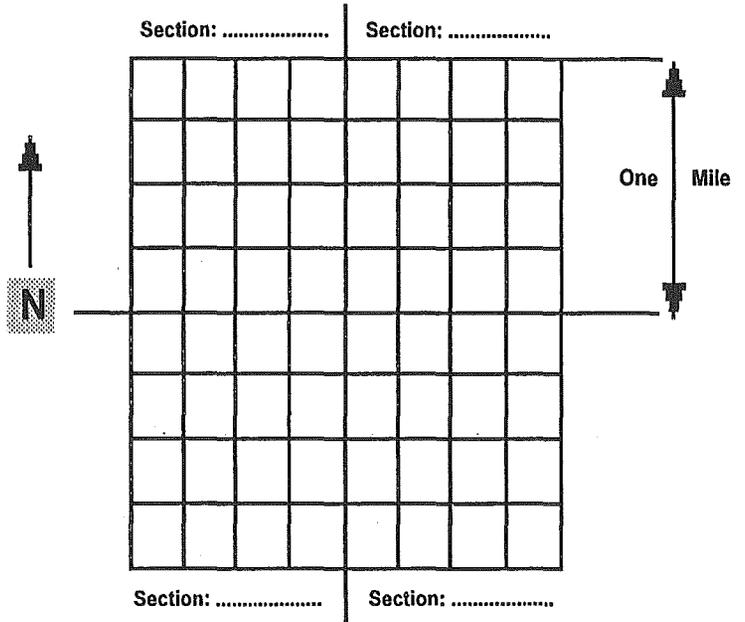
RANGE: _____ E or W
(please indicate)

SECTION(S): _____

COUNTY: _____

PLEASE NOTE:

The map is divided into 4 sections with each section divided into quarter-quarter sections. Please complete it by marking the appropriate section number(s) on the map and indicate as accurately as possible the location of the area treated.



WAC 296-306A-14520 What are the department's recommendations for cholinesterase monitoring? (Nonmandatory) (1) We recommend that you implement a screening program for cholinesterase monitoring for employees handling organophosphate and carbamate pesticides.

(2) Red blood cell and plasma cholinesterase testing of employees who handle toxicity class 1 or 2 carbamate or organophosphate pesticides is an acceptable bioassay method for determining the extent and effects of exposure to these types of pesticides. The schedule of testing should include a preexposure baseline level, followed by periodic monitoring during the period of exposure.

(3) You should provide baseline cholinesterase tests for all employees handling carbamate or organophosphate pesticides for 30 hours or more in any 30-day period.

(4) Employees should be given baseline tests before actual exposure, at the beginning of the growing season, or upon first hire. These baseline tests should be repeated every two years.

(5) Periodic tests should be conducted every 30 days after the initial baseline for the next three months, and every 60 days thereafter until organophosphate or carbamate pesticide exposure ceases.

(6) You should not allow a monitored employee to be further exposed to carbamate or organophosphate pesticides if any cholinesterase test in comparison to the baseline is less than 70% of red blood cell baseline levels or 60% of plasma baseline levels. These employees should not be further exposed to organophosphate pesticides until their cholinesterase levels return to 80% or more of their baseline levels.

(7) Employees should be monitored for plasma or red blood cell cholinesterase levels.

(8) Monitoring programs should include appropriate follow-up and referrals to health care providers as needed, and should include a mechanism for recordkeeping and report tracking.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-14520, filed 10/31/96, effective 12/1/96.]

Part K Working Near Overhead Lines

WAC 296-306A-150 Employees working near overhead lines.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-150, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-15003 What does this section cover? WAC 296-306A-150 does not apply to the construction, reconstruction, operation, or maintenance of overhead electrical conductors (and their supporting structures and associated equipment) by authorized and qualified electrical employees. It also does not apply to authorized and qualified employees engaged in the construction, reconstruction, operations and maintenance of overhead electrical circuits or conductors (and their supporting structures and associated equipment) of rail transportation systems, or electrical

generating, transmission, distribution, and communication systems.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-15003, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-15006 What clearance and safeguards are required to protect employees working near overhead lines? (1) All exposed overhead conductors must be isolated from accidental contact by employees or equipment.

(2) Irrigation pipe must not be stored within one hundred feet of overhead conductors.

(3) Upending irrigation pipe within one hundred feet of overhead conductors is prohibited.

(4) Water and irrigation systems, and other devices that discharge a conductive liquid, must be set up and operated so that the discharge from the system is directed more than ten feet away from overhead high-voltage lines, and avoids contact with any exposed electrical power conductor.

(5) Employees are prohibited from entering or working in proximity to high-voltage lines, unless there are guards to prevent accidental contact.

Note: Voltage 600V and higher is considered high voltage.

(6) The following are prohibited if it is possible to bring these objects within ten feet of high-voltage lines:

(a) Operating, erecting, or transporting tools, equipment, or a moving part;

(b) Handling, transporting, or storing materials; or

(c) Moving a building near high-voltage lines.

(7) Equipment or machines must be operated near power lines according to the following:

(a) For lines rated 50 kv. or below, minimum clearance between the lines and any part of the object must be ten feet;

(b) For lines rated over 50 kv. minimum clearance between the lines and any part of the object must be ten feet plus four tenths of an inch for each 1 kv., over 50 kv., or twice the length of the line insulator but never less than ten feet;

(c) In transit, the clearance must be a minimum of four feet for voltages less than 50 kv., ten feet for voltages over 50 kv. up to and including 345 kv., and sixteen feet for voltages up to and including 750 kv.;

(d) You must designate someone to observe clearance and give warning for operations where it is difficult for the operator to see well enough to maintain the necessary clearance.

Exception: You are exempt from this requirement if electrical distribution and transmission lines have been deenergized and visibly grounded at point of work; or if insulating barriers, not a part of or an attachment to the equipment or machinery, have been erected to prevent physical contact with the lines.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-15006, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-15009 What signs must an employer post to warn employees working near overhead lines? You must post and maintain in plain view of the operator on each derrick, power-shovel, drilling-rig, hay loader, hay stacker, or similar apparatus with parts that are capable of vertical, lateral or swinging motion, a durable warning sign

legible at twelve feet that says, "unlawful to operate this equipment within ten feet of high-voltage lines."

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-15009, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-15012 When must an employer notify the utility of employees working near overhead lines? The employer must notify the operator of high-voltage lines when any operations are to be performed, tools or materials handled, or equipment is to be moved or operated within ten feet of any high-voltage line. All required safety measures must be completed before proceeding with any work that would reduce the clearance requirements of this section.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-15012, filed 10/31/96, effective 12/1/96.]

Part L Temporary Labor Camps

WAC 296-306A-160 Temporary labor camps.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-160, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-16001 What requirements apply to camp sites? (1) You must ensure that all sites used for temporary labor camps are adequately drained. The site must be free from periodic flooding, and located at least 200 feet from a swamp, pool, sink hole, or other surface collection of water unless the water surface can be subject to mosquito control. Drainage from and through the camp must not endanger any domestic or public water supply. All sites must be free from depressions in which water may become a nuisance.

(2) All sites must be large enough to prevent overcrowding of necessary structures. The principal camp area for sleeping and for food preparation and eating must be at least 500 feet from where livestock are kept.

(3) The grounds and open areas surrounding the shelters must be maintained in a clean and sanitary condition.

(4) Whenever the camp is closed for the season or permanently, all garbage, manure, and other refuse must be collected and disposed of to prevent nuisance. All abandoned toilet pits must be filled with earth, and the grounds and buildings left in a clean and sanitary condition. If outhouse buildings remain, they must be locked or otherwise secured to prevent entrance.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-16001, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-16003 How must camp shelters be constructed? (1) You must ensure that every shelter in the camp is constructed to provide protection against the elements.

(2) Each room used for sleeping purposes must have at least 50 square feet of floor space for each occupant. The room must have at least a 7-foot ceiling.

(3) You must provide beds, cots, or bunks, and suitable storage facilities such as wall lockers for clothing and personal articles in every sleeping room.

(a) Beds must be at least 36 inches apart, both laterally and end to end, and the frame must keep mattresses at least 12 inches off the floor.

(b) Double-deck bunks must be spaced at least 48 inches apart, both laterally and end to end.

(c) The minimum clear space between lower and upper bunks must be at least 27 inches.

(d) Triple-deck bunks are prohibited.

(4) The floors of each shelter must be constructed of wood, asphalt, or concrete. Wooden floors must be smooth and tight. The floors must be kept in good repair.

(5) All wooden floors must be elevated at least 1 foot above ground level at all points to prevent dampness and to permit free air circulation.

(6) You may "bank" around outside walls with earth or other suitable material to guard against extreme low temperatures.

(7) All living quarters must have windows covering a total area equal to at least one-tenth of the floor area. You must ensure that at least one-half of each window can be opened for ventilation.

(8) All exterior openings must be screened with 16-mesh material. All screen doors must have self-closing devices.

(9) You must ensure that each dwelling unit has at least 70 square feet of floor space for the first occupant and at least 50 square feet of floor space for each additional occupant. In a family unit, the husband and wife must have a separate sleeping area whenever living with one or more children over six years old.

(10) In camps with common cooking facilities, you must provide stoves in an enclosed and screened shelter. You must provide one stove for every 10 people or one stove for every two families.

(11) You must provide sanitary facilities for storing and preparing food.

(12) If a camp is used during cold weather, you must provide adequate heating equipment.

Note: All heating, cooking, and water heating equipment must be installed according to state and local ordinances, codes, and regulations governing such installations.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-16003, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-16005 What requirements apply to the water supply? (1) In each camp, you must provide an adequate and convenient water supply for drinking, cooking, bathing, and laundry purposes. The water supply must be approved by the appropriate health authority.

"Adequate water supply" means a water supply that is capable of delivering 35 gallons per person per day to the campsite at a peak rate of 2 1/2 times the average hourly demand.

(2) You must ensure that the distribution lines are able to supply water at normal operating pressures to all fixtures for simultaneous operation. If water is not piped to the shelters, water outlets must be distributed throughout the

camp so that no shelter is more than 100 feet from a yard hydrant.

(3) Where water under pressure is available, you must provide one or more drinking fountains for each 100 occupants or fraction thereof. The construction of drinking fountains must comply with ANSI Standard Specifications for Drinking Fountains, Z4.2-1942. Common drinking cups are prohibited.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-16005, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-16007 Must an employer provide toilet facilities for the camp? (1) You must provide toilet facilities adequate for the camp capacity.

(2) You must ensure that no one has to pass through a sleeping room to reach a toilet room. Toilet rooms must either have a window of at least 6 square feet opening directly to the outside, or be satisfactorily ventilated. All outside openings must be screened with 16-mesh material. No fixture, water closet, chemical toilet, or urinal must be located in a room used for other than toilet purposes.

(3) A toilet room must be within 200 feet of the door of each sleeping room. An outhouse must be at least 100 feet away from any sleeping room, dining room, lunch area, or kitchen.

(4) Where toilet rooms are shared, such as in multifamily shelters and in barracks type facilities, you must provide separate toilet rooms for each sex. These rooms must be distinctly marked "men" and "women" by signs printed in English and in the native language of the persons occupying the camp, or marked with easily understood pictures or symbols. If the facilities for each sex are in the same building, they must be separated by solid walls or partitions extending from the floor to the roof or ceiling.

(5) Where toilet facilities are shared, you must provide water closets or outhouses for each sex, based on the maximum number of persons of that sex that the camp is designed to house at any one time. Water closets or outhouses must be provided in the ratio of one unit for each 15 persons, and a minimum of two units for any shared facility.

(6) You must provide one urinal or 2 linear feet of urinal trough for each 25 men. The floor from the wall and out at least 15 inches from the outer edge of the urinals must be constructed of materials impervious to moisture. Where water under pressure is available, urinals must have an adequate water flush. Urinal troughs in outhouses must drain freely into the pit or vault and the drain must be constructed to exclude flies and rodents from the pit.

(7) Every water closet installed after the effective date of these standards must be located in a toilet room.

(8) Each outhouse, water closet, or chemical toilet compartment must have an adequate supply of toilet paper.

(9) Toilet rooms must be kept in a sanitary condition and be cleaned at least daily.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-16007, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-16009 Must sewer lines connect to public sewers? All sewer lines and floor drains from

buildings must be connected to public sewers when sewers are available.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-16009, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-16011 What facilities must an employer provide for laundry, handwashing, and bathing? (1) Laundry, handwashing, and bathing facilities must be provided in the following ratio:

(a) One handwash basin per family shelter or per six persons in shared facilities.

(b) One shower head for every 10 persons.

(c) One laundry tray or tub for every 30 persons.

(d) One "deepwell" type sink in each building used for laundry, hand washing, and bathing.

(2) Floors must be moisture resistant and smooth but not slippery. All junctions of the curbing and the floor must be coved. The walls and partitions of shower rooms must be smooth and moisture resistant to the height of splash. All shower baths, shower rooms, or laundry rooms must have floor drains to remove waste water and facilitate cleaning.

(3) An adequate supply of hot and cold running water must be provided for bathing and laundry purposes. Facilities for heating water must be provided.

(4) Every service building must be provided with equipment capable of maintaining a temperature of at least 70°F.

(5) Facilities for drying clothes must be provided.

(6) All service buildings must be kept clean.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-16011, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-16013 What lighting must an employer provide in camp buildings? Each habitable room in a camp must have at least one ceiling-type light fixture and at least one separate floor-type or wall-type convenience outlet. Laundry and toilet rooms and rooms where people congregate must have at least one ceiling-type or wall-type fixture. Light levels in toilet and storage rooms must be at least 20 foot-candles 30 inches from the floor. Other rooms, including kitchens and living quarters, must be at least 30 foot-candles 30 inches from the floor.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-16013, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-16015 What requirements apply to refuse disposal? (1) Cleanable or single service containers that can be securely closed, approved by the state board of health, must be provided for garbage storage. At least one such container must be provided for each family shelter and must be located within 100 feet of each shelter on a wooden, metal, or concrete pad.

(2) Garbage containers must be kept clean.

(3) Garbage containers must be emptied when full, and at least twice a week.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-16015, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-16017 How must kitchens, dining halls, and feeding facilities be constructed? (1) In all

camps where central dining or multiple family feeding operations are permitted or provided, the food handling facilities must comply with the requirements of the "Food Service Sanitation Ordinance and Code," Part V of the Food Service Sanitation Manual, U.S. Public Health Service Publication 934 (1965).

(2) You must provide a properly constructed kitchen and dining hall, adequate in size, and separate from the sleeping quarters, in connection with all food handling facilities. There must be no direct opening from living or sleeping quarters into a kitchen or dining hall.

(3) No person with any communicable disease may work in food handling, in any kitchen or dining room operated in connection with a camp or regularly used by persons living in a camp.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-16017, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-16019 Must an employer provide insect and rodent control? You must take effective measures to prevent and control insect and rodent infestation.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-16019, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-16021 What first-aid facilities must be available in the camp? (1) In every camp, you must provide and maintain adequate first-aid facilities, approved by a health authority, for emergency treatment.

(2) A first-aid trained person must be in charge of first-aid facilities.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-16021, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-16023 When must an employer report communicable diseases in a camp? (1) You must report immediately to the local health officer the name and address of any individual in the camp known to have or suspected of having a communicable disease.

(2) Whenever suspected food poisoning or an unusual prevalence of fever, diarrhea, sore throat, vomiting, or jaundice occurs, the camp superintendent must report immediately the outbreak to the local health officer or state board of health.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-16023, filed 10/31/96, effective 12/1/96.]

INDOOR OPERATIONS

Part M

Guarding Tools; Farm Shops; Materials Handling

WAC 296-306A-185 Guarding powered saws.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-185, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-18503 What general requirements apply to powered saws? (1) You must ensure that all

cracked saw blades are removed from service, except as indicated in WAC 296-306A-18515(6).

(2) Inserting a wedge between a saw disk and its collar to form a "wobble saw" for rabbeting is prohibited.

Exception: This does not apply to properly designed adjustable rabbeting blades.

(3) You must ensure that any saw used for ripping has anti-kick-back fingers on each side and a spreader.

(4) You must ensure that ripping and ploughing are permitted only against the direction in which the saw turns. Mark the direction of saw rotation on the hood, and attach a permanent warning sign to the rear of the guard that prohibits ripping or ploughing from that position.

(5) You must provide push sticks or push blocks in sizes and types suitable for the work to be done.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-18503, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-18506 How must band saws be guarded? (1) You must ensure that all band wheels are completely encased or guarded on both sides. Guards must be constructed of not less than No. 14 U.S. gauge metal, nominal two-inch wood material, or mesh or perforated metal of not less than U.S. gauge No. 20 with openings not greater than three-eighths inch.

(2) You must ensure that all portions of the band saw blade are enclosed or guarded except the working side of the blade between the guide and the table.

(3) You must ensure that the guard for the portion of the blade between the sliding guide and the upper-saw-wheel guard protects the saw blade at the front and outer side.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-18506, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-18509 How must radial arm saws be guarded? (1) You must ensure that the upper hood completely encloses the upper portion of the blade, including the end of the saw arbor. The upper hood must be constructed to protect the operator from flying material, and to deflect sawdust. The sides of the lower exposed portion of the blade must be guarded to the full diameter of the blade by a device that will automatically adjust itself to the thickness of the stock and remain in contact with stock.

(2) You must provide a mechanism to prevent the leading edge of the saw from passing the front edge of the table or roll case.

(3) You must equip radial arm-saws with a mechanism to return the saw and keep it in position at the back of the table.

For example: You may use a counter-weight or a saw retractor device, or tilt the arm sufficiently to maintain the saw at the back when released by the operator.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-18509, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-18512 How must table saws be guarded? (1) You must ensure that each circular crosscut table saw is guarded by a standard hood that covers the saw at all times at least to the depth of the teeth. The hood must

adjust itself automatically to the thickness of, and must remain in contact with, the material being cut.

Exception: When finished surfaces of stock may be marred by the guard, it may be raised slightly to avoid contact. The hood must be designed to protect the operator from flying material.

(2) While used in performing rabbeting, ploughing, grooving or dado operations they may be used without a spreader, but upon completion of such operations, the spreader must be replaced immediately.

(3) You must ensure that the part of the table saw that is beneath the table is fully guarded.

(4) Power transmission components of table saws must be guarded according to WAC 296-306A-280.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-18512, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-18515 How must circular fuel-wood saws be guarded? (1) You must ensure that fuel-wood saws are guarded by a standard guard that completely encloses the blade to the depth of the teeth, except for the area where material is fed into the blade.

(2) You must ensure that the tables of fuel-wood saws is constructed so that material being sawed is supported on both sides of the blade.

(3) You must provide a mechanism that will prevent the leading edge of the saw from passing the front edge of the table or roll case.

(4) You must provide tilting tables of fuel-wood saws with a backrest for the full length of the table. The backrest must extend upward from the table platform at least to the height of the saw opening. An opening in a backrest must be a maximum of two inches. The backrest frame and filler must be constructed of material strong and rigid enough to prevent distortion under normal use.

(5) Power transmission components of fuel-wood saws must be guarded according to WAC 296-306A-280.

(6) When a circular fuel-wood saw blade develops a crack, you must discontinue its use until properly repaired, according to the following measurements.

Length of crack	Diameter of saw in inches
1/2"	12"
1"	24"
1-1/2"	36"

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-18515, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-190 Guarding bench grinders and abrasive wheels.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-190, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-19003 What definitions apply to this section? "Abrasive wheel" means a cutting tool consisting of abrasive grains held together by organic or

inorganic bonds. This includes diamond and reinforced wheels.

"Flanges" means collars, discs, or plates between which wheels are mounted. Also referred to as adapter, sleeve, or back.

"Mounted wheels" means wheels of various dimensions that are usually 2 inches in diameter or smaller. They can be either organic or inorganic bonded abrasive wheels. They are secured to plain or threaded steel mandrels.

"Off-hand grinding" means grinding material or a part that is held in the operator's hand.

"Portable grinding" means the grinding machine is hand-held and may be easily moved from one location to another.

"Reinforced wheels" means a class of organic wheels that contain strengthening fabric or filament. "Reinforced" does not mean wheels using such mechanical additions as steel rings, steel cup backs, or wire or tape winding.

"Safety guard" means an enclosure designed to restrain the pieces of the grinding wheel and protect the operator in the event that the wheel is broken in operation.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-19003, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-19006 What rules apply to guarding abrasive wheels? (1) Abrasive wheels must be used only on machines provided with safety guards.

Exception: This requirement does not apply to the following:
 (a) Wheels used for internal work while the wheel is within the work being ground.
 (b) Mounted wheels 2 inches and smaller in diameter, used in portable operations.
 (c) Types 16, 17, 18, 18R, and 19 cones, plugs, and threaded hole pot balls where the work offers protection.
 (d) Specially shaped "sickle grinding" wheels mounted in mandrel-type bench or floor stands.

(2) The safety guard must cover the spindle end, nut, and flange projections.

Exceptions:
 (a) When the work provides protection to the operator, the spindle end, nut, and outer flange may be exposed. When the work entirely covers the side of the wheel, the side covers of the guard may be omitted.
 (b) The spindle end, nut, and outer flange may be exposed on portable machines designed for, and used with, type 6, 11, 27, and 28 abrasive wheels, cutting off wheels, and tuck pointing wheels.
 (c) The spindle end, nut, and outer flange may be exposed on machines designed as portable saws.

(3) The guard must cover the sides and periphery of the wheel.

Exceptions:
 (a) Bench and floor stands;
 (i) The maximum permissible angle of exposure is 90°. This exposure must begin at a point not more than 65° above the horizontal plane of the wheel spindle.
 (ii) Wherever the nature of the work requires contact with the wheel below the horizontal plane of the spindle, the exposure must not exceed 125°. This exposure must begin at a point not more than 65° above the horizontal plane of the wheel spindle.
 (b) Swing-frame grinders may only be exposed on the bottom half; the top half of the wheel must be enclosed at all times.
 (c) Where the work is applied to the top of the wheel, the exposure of the grinding wheel periphery must not exceed 60°.
 (d) When the work entirely covers the side of the wheel, the side covers of the guard may be omitted.

(4) The safety guard must be mounted to maintain proper alignment with the wheel, and the strength of the fastenings must exceed the strength of the guard.

(5) Take care to see that the safety guard is properly positioned before starting the mounted wheel.

(6) Abrasive wheel machinery guards must meet the design specifications of ANSI B7.1-1970.

(7) Exception: WAC 296-306A-19006 does not apply to natural sandstone wheels and metal, wooden, cloth, or paper discs, with a layer of abrasive on the surface.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-19006, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-19009 What are the use, mounting, and guarding rules for abrasive wheels? (1) Immediately before mounting, the operator must closely inspect and sound (ring test) all wheels to make sure they are not damaged. Before mounting the wheel, the operator must check the spindle speed of the machine to be certain that it does not exceed the maximum operating speed marked on the wheel.

"Ring test" means to tap the wheel gently with a light nonmetallic implement, such as the handle of a screwdriver for light wheels, or a wooden mallet for heavier wheels.

(2) Grinding wheels must fit freely on the spindle and remain free under all grinding conditions. The wheel hole must be made suitably oversized to ensure that heat and pressure do not create a hazard.

(3) All contact surfaces of wheels, blotters, and flanges must be flat and free of foreign matter.

(4) Bushings used in the wheel hole must not exceed the width of the wheel and must not contact the flanges.

(5) On offhand grinding machines, work rests must be used to support the work. The work rest must be rigid and adjustable to compensate for wheel wear. Work rests must be kept adjusted closely to the wheel with a maximum opening of one-eighth inch to prevent the work from jamming between the wheel and the rest. The work rest must be securely clamped after each adjustment and shall not be adjusted with the wheel in motion.

(6) Goggles or face shields must be used when grinding.

(7) Nonportable grinding machines must be securely mounted on substantial floors, benches, foundations, or other adequate structures.

(8) After mounting, abrasive wheels must be run at operating speed with the safety guard in place and properly adjusted, or in a protected enclosure for at least one minute before applying work. During this time, no one may stand in front of or in line with the wheel.

(9) Grinders or abrasive wheels that vibrate or are out of balance must be repaired before use.

(10) Abrasive wheels not designed for the machine or guard must not be mounted on a grinder.

(11) Side grinding must only be performed with wheels designed for this purpose.

Note: Light grinding on the side of straight wheels is permitted only when very delicate pressure is applied.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-19009, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-19012 What requirements apply to flanges? (1) Grinding machines must have flanges.

(2) All abrasive wheels must be mounted between flanges that are at least one-third the diameter of the wheel. Regardless of flange type used, the wheel must always be guarded. Blotters must be used according to this section.

(3) Design and material requirements include:

(a) Flanges must be designed to transmit the driving torque from the spindle to the grinding wheel.

(b) Flanges must be made of steel, cast iron, or other material of equal or greater strength and rigidity.

(4) An abrasive wheel that is designed to be held by flanges must not be operated without them. Except for those types requiring flanges of a special design, flanges must be at least one-third the diameter of the wheel.

(5) Facings of compressible material (blotters) must be inserted between the abrasive wheel and flanges to ensure uniform distribution of flange pressure.

(6) All flanges must be maintained in good condition. When the bearing surfaces become damaged, they should be trued or refaced. When refacing or truing, exercise care to make sure that proper relief and rigidity is maintained before starting the wheel.

(7) Where the operator may stand in front of the opening, safety guards must be adjustable to compensate for wheel wear. The distance between the wheel periphery and the adjustable tongue or the guard above the wheel must not exceed one-quarter inch.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-19012, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-19015 How must vertical portable grinders be guarded? Safety guards on right angle head or vertical portable grinders must have a maximum exposure angle of 180°, and the guard must be between the operator and the wheel during use. The guard must be adjusted so that pieces of an accidentally broken wheel will be deflected away from the operator.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-19015, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-19018 How must other portable grinders be guarded? Other portable grinding machines must be guarded so that only the bottom half of the wheel is exposed. The top half of the wheel must be enclosed at all times.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-19018, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-195 What rules apply to grounding and "dead man" controls for hand-held portable power tools? (1) Each hand-held, power-driven tool must have a "dead man" control, such as a spring-actuated switch, valve, or equivalent device, so that the power will be automatically shut off whenever the operator releases the control.

(2) The frames and all exposed, noncurrent-carrying metal parts of portable electric machinery, operated at more than fifty volts to ground, must be grounded. Other hand-held portable motors driving electric tools must be grounded if they operate at more than fifty volts to ground. The ground must use a separate ground wire and polarized plug and receptacle.

Exception: Double insulated tools that are designed and used according to the requirements of Article 250-45 of the National Electrical Code (1971 edition) are exempt from the grounding requirements.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-195, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-200 Compressed air.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-200, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-20005 May compressed air be used for cleaning? Using compressed air for cleaning purposes is prohibited, except where the pressure is reduced to less than 30 psi and then only with effective chip guarding and personal protective equipment.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-20005, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-20010 What requirements apply to compressed air tools? (1) When using compressed air tools, use care to prevent the tool from being shot from the gun.

(2) When momentarily out of use, the gun should be laid so that the tool cannot fly out if the pressure is accidentally released. When not in use, all tools should be removed from the gun.

(3) When disconnecting a compressed air tool from the air line, first shut off the pressure and then operate the tool to release the pressure remaining in the hose.

(4) Compressed air hose or guns must not be pointed at or brought into contact with the body of any person.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-20010, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-205 Guarding portable powered tools.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-205, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-20505 What requirements apply to guarding portable powered tools? (1) All portable, power-driven circular saws with a blade diameter greater than 2 inches must have guards above and below the base plate or shoe.

(a) The upper guard must cover the saw to the depth of the teeth, except for the minimum arc required to permit the base to be tilted for bevel cuts.

(b) The lower guard must cover the saw to the depth of the teeth, except for the minimum arc required to allow proper retraction and contact with the work.

(c) When the tool is withdrawn from the work, the lower guard must automatically and instantly return to covering position.

(2) Portable belt sanding machines must have guards at each nip point where the sanding belt runs onto a pulley. These guards must prevent the hands or fingers of the operator from coming in contact with the nip points. The

unused run of the sanding belt must be guarded against accidental contact.

(3) Portable electric powered tools must meet the electrical requirements of chapter 296-306A WAC Part T.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-20505, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-20510 What requirements apply to switches and controls on portable powered tools? (1) The following powered tools must have a constant pressure switch or control that will shut off the power when the pressure is released:

- All hand-held powered circular saws with a blade diameter-greater than 2 inches;
- Electric, hydraulic or pneumatic chain saws; and
- Percussion tools without positive accessory holding means.

All hand-held gasoline powered chain saws must have a constant pressure throttle control that will shut off the power to the saw chain when the pressure is released.

(2) The following powered tools must have a constant pressure switch or control:

- All hand-held powered drills, tappers, fastener drivers, and horizontal, vertical, and angle grinders with wheels greater than 2 inches in diameter;
- Disc sanders with discs greater than 2 inches in diameter;
- Belt sanders;
- Reciprocating saws;
- Saber, scroll, and jig saws with blade shanks greater than a nominal 1/4 inch; and
- Other similarly operating powered tools.

These tools may have a lock-on control if they can be turned off by a single motion of the same finger or fingers that turn it on.

(3) The following powered tools must have either a positive on-off control, or other controls as described above:

- All other hand-held powered tools, including:
- Platen sanders;
- Grinders with wheels 2 inches in diameter or less;
- Disc sanders with discs 2 inches in diameter or less;
- Routers;
- Planers;
- Laminate trimmers;
- Nibblers;
- Shears; and
- Saber, scroll, and jig saws with blade shanks a nominal 1/4 inch wide or less.

(a) Saber, scroll, and jig saws with nonstandard blade holders may use blades with shanks that are nonuniform in width, if the narrowest portion of the blade shank is an integral part in mounting the blade.

(b) Blade shank width must be measured at the narrowest portion of the blade shank when saber, scroll, and jig saws have nonstandard blade holders.

(c) "Nominal" in this section means +0.05 inch.

(4) The operating control on hand-held power tools must be located to minimize the possibility of accidental operation that would constitute a hazard to employees.

Exception: This section does not apply to concrete vibrators, concrete breakers, powered tampers, jack hammers, rock drills,

garden appliances, household and kitchen appliances, personal care appliances, or to fixed machinery.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-20510, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-20515 What requirements apply to pneumatic powered tools and hose? (1) The operating trigger on portable pneumatic powered tools must be located to minimize the possibility of accidental operation and arranged to close the air inlet valve automatically when the operator removes pressure.

(2) A tool retainer must be installed on each tool that would otherwise be ejected from the hose.

(3) Hose and hose connections used for conducting compressed air to utilization equipment must be designed for the pressure and service to which they are subjected.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-20515, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-220 Power lawnmowers.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-220, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-22003 What definitions apply to this section? "Blade tip circle" means the path described by the outermost point of the blade as it rotates about its shaft axis.

"Catcher assembly" means a part that provides a means for collecting grass clippings or debris.

"Deadman control" means a control designed to automatically interrupt power to a drive when the operator releases the control.

"Guard" means a part for shielding a hazardous area of a machine.

"Lowest blade position" means the lowest blade position when the mower is not in use.

"Operator area" (walk-behind mowers) means a circular area behind the mower that is no smaller than 30 inches in diameter, the center of which is 30 inches behind the nearest blade tip circle.

"Power reel mower" means a lawn-cutting machine with a power source that rotates one or more helically formed blades about a horizontal axis and creates a shearing action with a stationary cutter bar or bed knife.

"Power rotary mower" means a lawn-cutting machine with a power source that rotates one or more cutting blades about a vertical axis.

"Riding mower" means a powered, self-propelled lawn-cutting vehicle on which the operator rides and controls the machine.

"Sulky type mower" means a walk-behind mower that has been converted to a riding mower by the addition of a sulky.

"Walk-behind mower" means a mower either pushed or self-propelled and normally guided by the operator walking behind the unit.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-22003, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-22006 What are the general guarding requirements for power lawnmowers? (1) Walk-behind, riding-rotary, and reel power lawnmowers designed for use by employees must meet the design specifications in ANSI B71.1-1968.

Exception: These specifications do not apply to sulky-type mowers, flail mowers, sickle-bar mowers, or mowers designed for commercial use.

(2) All power-driven chains, belts, and gears must be positioned or guarded to prevent accidental contact with the operator during normal starting, mounting, and operation of the machine.

(3) The motor must have a shut-off device that requires manual and intentional reactivation to restart the motor.

(4) All positions of the operating controls must be clearly identified.

(5) The words, "Caution — Be sure the operating control(s) is in neutral before starting the engine," or similar wording must be clearly visible at an engine starting control point on self-propelled mowers.

(6) All power lawn mowers must be used according to the manufacturer's instructions.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-22006, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-22009 What rules apply to walk-behind and riding rotary mowers? (1) The mower blade must be enclosed except on the bottom and the enclosure must extend to or below the lowest blade position.

(2) Guards that must be removed to install a catcher assembly must meet the following requirements:

(a) Warning instructions are attached to the mower near the opening stating that the mower must not be used without either the catcher assembly or the guard in place.

(b) The mower is used only with either the catcher assembly or the guard in place.

(c) The catcher assembly is properly and completely installed.

(3) The word "caution" or stronger wording must be placed on the mower at or near each discharge opening.

(4) Blade(s) must stop rotating from the manufacturer's specified maximum speed within 15 seconds after declutching, or shutting off power.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-22009, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-22012 What rules apply to walk-behind rotary mowers? (1) The horizontal angle of the grass discharge opening(s) in the blade enclosure must not contact the operator area.

(2) There must be one of the following at all grass discharge openings:

(a) A minimum of 3 inches between the end of the discharge chute and the blade tip circle; or

(b) A rigid bar fastened across the discharge opening, secured to prevent removal without the use of tools. The bottom of the bar must be no higher than the bottom edge of the blade enclosure.

(3) The highest point(s) on the blade enclosure front, except discharge-openings, must be a maximum of 1-1/4 inches above the lowest blade position. Mowers with a

swingover handle are considered to have no front in the blade enclosure and therefore must comply with WAC 296-306A-22009(1).

(4) The mower handle must be fastened to the mower to prevent loss of control by unintentional uncoupling while in operation.

(5) Mower handles must be locked in the normal operating position(s) so that they cannot be accidentally disengaged during normal mower operation.

(6) A swingover handle must meet the requirements of this section.

(7) Wheel drive disengaging controls, except deadman controls, must move opposite to the direction of the vehicle motion in order to disengage the drive. Deadman controls may operate in any direction to disengage the drive.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-22012, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-22015 What rules apply to riding rotary mowers? (1) The highest point(s) of all openings in the blade enclosure front must be a maximum of 1 1/4 inches above the lowest blade position.

(2) Opening(s) must not allow grass or debris to discharge directly toward the operator seated in normal operator position.

(3) There must be one of the following at all grass discharge openings:

(a) A minimum of 6 inches between the end of the discharge chute and the blade tip circle; or

(b) A rigid bar fastened across the discharge opening secured to prevent removal without the use of tools. The bottom of the bar must be no higher than the bottom edge of the blade enclosure.

(4) Mowers must have stops to prevent jackknifing or locking of the steering mechanism.

(5) The mower must have brakes.

(6) Hand-operated wheel drive disengaging controls must move opposite to the direction of vehicle motion in order to disengage the drive. Foot-operated wheel drive disengaging controls must be depressed to disengage the drive. Deadman controls, both hand and foot operated, may operate in any direction to disengage the drive.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-22015, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-225 Jacks.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-225, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-22503 What definitions apply to this section? "Jack" means an appliance for lifting and lowering or moving horizontally a load using a pushing force.

Note: Jack types include lever and ratchet, screw, and hydraulic.

"Rating" means the maximum working load for which a jack is designed to lift the load safely throughout its travel.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-22503, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-22506 How shall the rated load be marked on a jack? (1) The operator must make sure that the jack used has a load rating sufficient to lift and sustain the load.

(2) The rated load must be legibly and permanently marked in a prominent location on the jack by casting, stamping, or other suitable means.

Note: You should follow the manufacturer's specifications to raise the rated load of a jack.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-22506, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-22509 What rules apply to the operation and maintenance of jacks? (1) If the foundation is not firm, you must block the base of the jack. If the cap might slip, you must place a block in between the cap and the load.

(2) The operator must watch the stop indicator, which must be kept clean, in order to determine the limit of travel. The indicated limit must not be overrun.

(3) After the load has been raised, it must immediately be cribbed, blocked, or otherwise secured.

(4) Hydraulic jacks exposed to freezing temperatures must be supplied with an adequate antifreeze liquid.

(5) All jacks must be properly lubricated at regular intervals. The lubricating instructions of the manufacturer should be followed, and only lubricants recommended by the manufacturer should be used.

(6) You must ensure that each jack is thoroughly inspected according to the service conditions and at least:

(a) For constant or intermittent use at one locality, once every 6 months;

(b) For jacks sent out of shop for special work, when sent out and when returned;

(c) For a jack subjected to abnormal load or shock, immediately before and immediately thereafter.

(7) Repair or replacement parts must be examined for possible defects.

(8) Jacks that are out of order must be tagged, and not be used until repaired.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-22509, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-230 What are the general requirements for materials handling and storage? (1) Safe clearances of three feet must be allowed for aisles, loading docks, doorways, and wherever turns or passage must be made. Passageways must be kept clear and in good repair, with no obstructions.

(2) Bags, bales, boxes, and other containers stored in tiers must be made secure against sliding or collapse.

(3) Storage areas must be kept free from any accumulation of materials that could cause tripping, fire, or explosion.

(4) Employees must be instructed in proper lifting or moving techniques and methods. Mechanical devices or assistance in lifting must be used when moving heavy objects.

(5) When removing material stored in piles, employees must remove material in a manner that maintains the stability of the pile and prevents collapse.

(6) Storage areas must have proper drainage.

(7) You must provide clearance signs to warn of clearance limits.

(8) For powered industrial truck (forklift) requirements, see WAC 296-306A-520.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-230, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-232 What requirements apply to conveyors? Conveyors must be constructed, operated, and maintained according to ANSI B 20.1-1957.

(1) When the return strand of a conveyor operates within seven feet of the floor, there must also be a trough strong enough to carry the weight resulting from a broken chain.

(2) If the strands are over a passageway, a means must be provided to catch and support the ends of the chain in the event of a break.

(3) When the working strand of a conveyor crosses within three feet of the floor level in passageways, a bridge must be provided for employees to cross over the conveyor.

(4) Whenever conveyors pass adjacent to or over working areas or passageways, protective guards must be installed. These guards must be designed to catch and hold any load or materials that may fall off or dislodge and injure an employee.

(5) Employees must be prohibited from walking on the rolls of roller-type conveyors, except in an emergency.

(6) Guards, screens, or barricades that are strong enough to prevent material from falling must be installed on all sides of the shaftway of elevator-type conveyors except at openings where material is loaded or unloaded. Automatic shaftway gates or suitable barriers must be installed at each floor level where material is loaded or unloaded from the platform.

(7) Conveyors must have an emergency stopping device that can be reached from the conveyor. The device must be located near the material entrance to each chopper, mulcher, saw, or similar equipment.

Exception: The emergency stopping device is not required where the conveyor leading into the equipment is under constant control of an operator with full view of the material entrance and the conveyor is located where the operator cannot fall onto it.

(8) Where conveyors are over seven feet high, means must be provided to safely permit essential inspection and maintenance operations.

(9) Any part showing signs of significant wear must be inspected carefully and replaced before it creates a hazard.

(10) Replacement parts must be equal to or exceed the manufacturer's specifications.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-232, filed 10/31/96, effective 12/1/96.]

Part N Sanitation for Indoor Workplaces

WAC 296-306A-240 Sanitation for fixed, indoor workplaces.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-240, filed 10/31/96, effective 12/1/96.]

(1997 Ed.)

WAC 296-306A-24001 Must an employer comply with state health regulations? You must comply with the rules and regulations of the state board of health governing sanitation in the workplace. We enforce these regulations according to RCW 43.20.050.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-24001, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-24003 What does this section cover? WAC 296-306A-240 covers sanitation for employees who normally work in fixed, indoor places of agricultural employment.

A "fixed, indoor workplace" is one where the employees perform a majority of their duties at that site.

This does not cover field employees who only occasionally enter a shop or other farm building as part of their normal duties. Field employees are covered by the field sanitation requirements of WAC 296-306A-095.

This section does not cover measures for the control of toxic materials.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-24003, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-24006 What definitions apply to this section? "Lavatory" means a basin used exclusively for washing hands, arms, face, and head.

"Personal service room" means a room used for activities not directly connected with the business function of the employer. Such activities include but are not limited to, first aid, medical services, dressing, showering, toilet use, washing, and eating.

"Potable water" means water that meets state or local quality standards for drinking water, or water that meets the quality standards of the Environmental Protection Agency's "National Interim Primary Drinking Water Regulations," published in 40 CFR, Part 141, and 40 CFR 147.2400.

"Toilet facility" means a fixture maintained within a toilet room for the purpose of defecation or urination, or both.

"Toilet room" means a room maintained within or on the premises of any place of employment, containing toilet facilities for employee use.

"Toxic material" means a material that exceeds a regulatory limit (such as in chapter 296-62 WAC), or toxicity that causes or is likely to cause death or serious physical harm.

"Urinal" means a toilet facility maintained within a toilet room for the sole purpose of urination.

"Water closet" means a toilet facility maintained within a toilet room for the purpose of both defecation and urination and which is flushed with water.

"Wet process" means any process or operation in a workroom that normally results in walking or standing surfaces becoming wet.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-24006, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-24009 What housekeeping requirements apply to fixed, indoor workplaces? (1) You must ensure that all places of employment are kept clean to the extent that the work allows.

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(2) You must ensure that the floor of every workroom is kept as dry as possible. Where wet processes are used, you must maintain drainage. You must provide false floors, platforms, mats, or other dry standing places where practical, or provide appropriate waterproof footwear.

(3) To facilitate cleaning, every floor, working place, and passageway must be kept free from protruding nails, splinters, loose boards and unnecessary holes and openings.

(4) Cleaning and sweeping must be done to minimize dust in the air and when practical, done outside of working hours.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-24009, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-24012 How must the potable water supply be maintained? (1) You must provide potable water in all places of employment, for drinking, washing of the person, cooking, washing food, washing cooking or eating utensils, washing food preparation or processing premises, and for personal service rooms.

(2) Potable drinking water dispensers must be maintained in sanitary condition, be closeable, and have a tap.

(3) Open containers for drinking water from which the water must be dipped or poured, even if fitted with a cover, are prohibited.

(4) A common drinking cup and other common utensils are prohibited.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-24012, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-24015 How must the nonpotable water supply be maintained? (1) You must ensure that nonpotable water is marked as unsafe and is not used for drinking, washing of the person, cooking, washing food, washing cooking or eating utensils, washing food preparation or processing premises, or personal service rooms, or for washing clothes.

(2) Nonpotable water used for cleaning any other work premises must be free of concentrations of chemicals, fecal coliform, or other substances that could create unsanitary conditions or be harmful to employees.

(3) Nonpotable water systems or systems carrying any other nonpotable substance must be constructed to prevent backflow or backsiphonage into a potable water system.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-24015, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-24018 What toilet facilities must an employer provide? (1) You must provide toilet facilities, with separate toilet rooms for each sex, according to the requirements in the table below. You must provide facilities for each sex based on the number of employees of that sex for whom facilities are furnished.

(2) Where single-occupancy rooms have more than one toilet facility, only one facility in each toilet room counts toward these requirements.

In this table, "number of employees" means the maximum number of employees present at any one time on a regular shift.

Number of employees	Minimum number of water closets
1 to 15	1
16 to 35	2
36 to 55	3
56 to 80	4
81 to 110	5
111 to 150	6
Over 150	One additional fixture for each additional 40 employees

(3) Where toilet rooms are occupied by one person at a time, can be locked from the inside, and contain at least one water closet, separate toilet rooms for each sex need not be provided.

(4) Where toilet facilities will not be used by women, urinals may be provided instead of water closets, except that the number of water closets must not be less than 2/3 of the minimum specified.

(5) The sewage disposal method must not endanger the health of employees.

(6) Toilet paper with holder must be provided for every water closet.

(7) Each water closet must occupy a separate compartment with a door and walls or partitions between fixtures high enough to ensure privacy.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-24018, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-24021 What washing facilities must an employer provide? You must provide facilities for maintaining personal cleanliness in the workplace. The facilities must be convenient for employees and maintained in a sanitary condition.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-24021, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-24024 What requirements apply to lavatories? (1) You must ensure that lavatories are available in all workplaces.

(2) Each lavatory must have hot and cold running water, or tepid running water.

(3) You must provide hand soap or similar cleansing agent.

(4) You must provide individual hand towels, warm air blowers, or clean individual sections of continuous cloth toweling convenient to the lavatories.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-24024, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-24027 When must an employer provide change rooms? (1) Whenever employees are required by a WISHA standard to wear protective clothing because of the possibility of contamination with toxic materials, you must provide change rooms with separate storage facilities for street clothes and for the protective clothing.

(2) If you provide work clothes for employees, they must be dry.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-24027, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-24030 What requirements apply to consumption of food and beverages in the workplace?

(1) This section applies to workplaces where employees may consume food, beverages, or both on the premises.

(2) No employee may consume food or beverages in a toilet room nor in any area exposed to a toxic material.

(3) If your workplace exposes employees to injurious dusts or other toxic materials, you must provide a separate lunchroom unless it is convenient for employees to lunch away from the premises. The size of the lunchroom must be based on the maximum number of persons using the room at one time, according to the following table.

Number of persons	Square feet per person
25 and less	13
26 - 74	12
75 - 149	11
150 and over	10

(4) You must provide receptacles of smooth, corrosion resistant, easily cleanable, or disposable materials for the disposal of waste food. You must provide enough receptacles to encourage their use and to prevent overfilling. Receptacles must be emptied at least once a working day and maintained in sanitary condition. Receptacles must have a solid tight-fitting cover unless sanitary condition can be maintained without a cover.

(5) No food or beverages may be stored in toilet rooms or in an area exposed to toxic material.

(6) All employee food service facilities and operations must follow sound hygienic principles. If all or part of the food service is provided, the food dispensed must be wholesome and free from spoilage. Food must be processed, prepared, handled, and stored so as to prevent contamination.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-24030, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-24033 How must waste be stored and removed?

(1) You must ensure that any receptacle used for waste or garbage that may rot is constructed so that it does not leak and can be thoroughly cleaned and maintained in a sanitary condition. A receptacle must have a solid tight-fitting cover, unless it can be maintained in a sanitary condition without a cover. Receptacles designed to maintain sanitary condition may be used in place of this requirement.

(2) All sweepings, solid or liquid wastes, refuse, and garbage must be removed to avoid creating a health menace, and as often as necessary to maintain the workplace in a sanitary condition.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-24033, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-24036 When must an employer have a vermin control program? Every building with personal service, food preparation, or eating rooms must be constructed, equipped, and maintained to restrict infestation by rodents, insects, and other vermin. You must have a continuing and effective extermination program where vermin are present.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-24036, filed 10/31/96, effective 12/1/96.]

Part O

Walking Working Surfaces; Fixed Industrial Stairs; Aerial Manlifts

WAC 296-306A-250 Walking working surfaces, elevated walkways, and platforms.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-250, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-25003 What definitions apply to this section? "Floor hole" means an opening with the smallest dimension between one and 12 inches, in any floor, platform, pavement, or yard, through which materials may fall but not people. Examples are a belt hole, pipe opening, or slot opening.

"Floor opening" means an opening with the smallest dimension of 12 inches or more, in any floor, platform, pavement, or yard, through which people may fall. Examples are a hatchway, stair or ladder opening, pit, or large manhole. Floor openings occupied by elevators, dumb waiters, conveyors, machinery, or containers are excluded from this definition.

"Handrail" means a single bar or pipe supported on brackets from a wall or partition to furnish persons with a handhold in case of tripping.

"Platform" means a working space for people that is elevated above the surrounding floor or ground, such as a balcony or platform for the operation of machinery and equipment.

"Runway" means a passageway used by people that is elevated above the surrounding floor or ground level, such as a footwalk along shafting or a walkway between buildings.

"Standard railing" means a vertical barrier along exposed edges of a floor opening, wall opening, ramp, platform, or runway to prevent people from falling.

"Standard strength and construction" means any construction of railings, covers, or other guards that meets the requirements of this section.

"Stair railing" means a vertical barrier along exposed sides of a stairway to prevent people from falling.

"Toeboard" means a vertical barrier at floor level along exposed edges of a floor opening, wall opening, platform, runway, or ramp to prevent materials from falling.

"Wall hole" means an opening between one and 30 inches high, of any width, in any wall or partition, such as a ventilation hole or drainage scupper.

"Wall opening" means an opening at least 30 inches high and 18 inches wide, in any wall or partition, through

which people may fall, such as a yard-arm doorway or chute opening.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-25003, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-25006 When may railings be omitted? Railings may be omitted from sections of open-sided floors, platforms, or walkways where guard rails impair operations, if railings are replaced when they no longer impair operations.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-25006, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-25009 What protection must an employer provide for floor openings? (1) Every stairway floor opening must be guarded by a standard railing constructed according to this section. The railing must guard all exposed sides (except the entrance to the stairway). Infrequently used stairways where traffic across the opening prevents using a fixed standard railing (as when located in aisle spaces, etc.), may use an alternate guarding method. In these cases, the guard must have a hinged floor opening cover of standard strength and construction and removable standard railings on all exposed sides (except at the entrance to the stairway).

(2) Every ladderway floor opening or platform must be guarded by a standard railing with standard toeboard on all exposed sides (except at the entrance to the opening). The passage through the railing must have either a swinging gate or offset so that a person cannot walk directly into the opening.

(3) Every hatchway and chute floor opening must be guarded by one of the following:

(a) A hinged floor opening cover of standard strength and construction with standard railings, or a permanent cover with only one side exposed. When the opening is not in use, the cover must be closed or the exposed side must be guarded at both the top and middle by removable standard railings.

(b) A removable railing with toeboard on a maximum of two sides of the opening and with fixed standard railings and toeboards on all other exposed sides. The removable railings must be kept in place when the opening is not in use and should be hinged or mounted to be easily replaced.

(4) When employees must feed material into any hatchway or chute opening, you must provide protection to prevent people from falling through the opening.

(5) When practical, the area under floor openings must be fenced off. Otherwise, the area must be plainly marked with yellow lines and telltales hanging within 5-1/2 feet of the ground or floor level.

(6) Where floor openings are used to drop materials from one level to another, audible warning systems must be installed and used to indicate to employees on the lower level when material is dropped.

(7) Every skylight opening and hole must be guarded by a standard skylight screen or a fixed standard railing on all exposed sides.

(8) Every infrequently used pit and trapdoor floor opening must be guarded by a floor opening cover of standard strength and construction that should be hinged in

place. When the cover is not in place, the pit or trap opening must be constantly attended or protected on all exposed sides by removable standard railings.

(9) Every manhole floor opening must be guarded by a standard manhole cover. The manhole cover may be left unhinged. When the cover is removed, the manhole opening must be constantly attended or protected by removable standard railings.

(10) Every temporary floor opening must have standard railings or must be constantly attended.

(11) Every floor hole that people can accidentally walk into must be guarded by either:

(a) A standard railing with standard toeboard on all exposed sides; or

(b) A floor hole cover of standard strength and construction that should be hinged in place. While the cover is not in place, the floor hole must be constantly attended or protected by a removable standard railing.

(12) Every floor hole surrounded by fixed machinery, equipment, or walls that prevent people from walking into it, must be protected by a cover that leaves openings a maximum of one inch wide. The cover must be securely held in place to prevent tools or materials from falling through.

(13) Where doors or gates open directly on a stairway, a platform must be provided so that the swing of the door does not reduce the platform width to less than 20 inches.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-25009, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-25012 What protection must an employer provide for wall openings and holes? (1) Every wall opening from which there is a drop of more than 4 feet must be guarded by one of the following:

(a) A rail, roller, picket fence, half door, or equivalent barrier.

The guard may be removable but should be hinged or mounted so it can be easily replaced. When employees working below the opening are exposed to falling materials, a removable toeboard or the equivalent must also be provided. When the opening is unused, the guard must be kept in position even with a door on the opening. In addition, a grab handle must be provided on each side of the opening with its center approximately 4 feet above floor level and of standard strength and mounting.

(b) An extension platform onto which materials can be hoisted for handling, and that has side rails or equivalent guards of standard specifications.

(2) Every chute wall opening from which there is a drop of more than 4 feet must be guarded according to subsection (1) of this section or as required by the conditions.

(3) Every window wall opening at a stairway landing, floor, platform, or balcony, from which there is a drop of more than 4 feet, and where the bottom of the opening is less than 3 feet above the platform or landing, must be guarded by standard slats, standard grillwork according to WAC 296-306A-25042(3), or a standard railing.

Where the window opening is below the landing, or platform, a standard toeboard must be provided.

(4) Every temporary wall opening must have adequate guards that may be of less than standard construction.

(5) Where there is a hazard of materials falling through a wall hole, and the lower edge of the near side of the hole is less than 4 inches above the floor, and the far side of the hole is more than 5 feet above the next lower level, the hole must be protected by a standard toeboard or a solid enclosing screen, or according to WAC 296-306A-25042(3).

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-25012, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-25015 What protection must an employer provide for open-sided floors, platforms, and runways? (1) Every open-sided floor or platform 4 feet or more above an adjacent floor or ground level must be guarded by a standard railing (or the equivalent according to WAC 296-306A-10003(3)) on all open sides, except where there is an entrance to a ramp, stairway, or fixed ladder. The railing must have a toeboard wherever, beneath the open sides:

- (a) A person can pass; or
- (b) There is moving machinery; or
- (c) Materials falling onto equipment would create a hazard.

(2) Every runway must be guarded by a standard railing (or the equivalent according to WAC 296-306A-25027) on all open sides that are 4 feet or more above floor or ground level. Wherever tools, machine parts, or materials are likely to be used on the runway, a toeboard must also be provided on each exposed side.

Runways used exclusively for special purposes (such as oiling, shafting, or filling tank cars) may have the railing on one side omitted when operating conditions require, if the hazard is minimized by using a runway at least 18 inches wide. Where people entering runways become exposed to machinery, electrical equipment, or hazards other than from falling, additional guarding may be necessary.

(3) Regardless of height, all open-sided floors, walkways, platforms, or runways above or adjacent to dangerous equipment, pickling or galvanizing tanks, degreasing units, or similar hazardous equipment, must be guarded with a standard railing and toeboard.

(4) Tools and loose materials must not be left on overhead platforms and scaffolds.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-25015, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-25018 What requirements apply to stairway railings and guards? (1) Every flight of stairs having four or more risers must have standard stair railings or standard handrails as follows (stairway widths measured clear of all obstructions except handrails):

(a) Stairways less than 44 inches wide with both sides enclosed must have at least one handrail, preferably on the right side descending.

(b) Stairways less than 44 inches wide with one side open must have at least one stair railing on the open side.

(c) Stairways less than 44 inches wide with both sides open must have one stair railing on each side.

(d) Stairways more than 44 inches wide but less than 88 inches wide must have one handrail on each enclosed side and one stair railing on each open side.

(e) Stairways 88 or more inches wide must have one handrail on each enclosed side, one stair railing on each open side, and one intermediate stair railing at the approximate middle.

Exception: Vehicle service pit stairways are exempt from this requirement if hand or stair rails would prevent vehicle movement into position over the pit.

(2) Winding stairs must have a handrail that prevents walking on all portions of the treads that are less than 6 inches wide.

(3) Nonindustrial and "monumental" steps are exempt from the requirements of this section. However, public and private building steps at loading or receiving docks, in maintenance areas, etc., and stairs used exclusively by employees, must meet the requirements of this section.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-25018, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-25021 How must a standard railing be constructed? A standard railing must meet the following requirements:

(1) The railing has a top rail, intermediate rail, and posts.

(2) The railing height is between thirty-six and forty-two inches nominal from the upper surface of the top rail to the floor, platform, runway, or ramp level.

(3) The top rail is smooth.

(4) The intermediate rail is approximately halfway between the top rail and the floor, platform, runway, or ramp.

(5) The ends of the rails do not overhang the terminal posts except where the overhang does not create a hazard.

(6) Guardrails taller than 42 inches are constructed so they do not create a hazard. Additional mid-rails are installed so that openings beneath the top rail prevent a spherical object with a 19-inch or larger diameter from falling through.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-25021, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-25024 How must a stair railing be constructed? A stair railing must be constructed similar to a standard railing. The stair railing must be between 34 and 30 inches tall measured from the top of the top rail to the tread surface meeting the face of the riser at the forward edge of the tread.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-25024, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-25027 What are the requirements for railing dimensions? Standard railings must meet the following requirements:

(1) For wood railings:

(a) The posts are of at least two inch by four inch nominal stock spaced six feet apart or less; and

(b) The top and intermediate rails are of at least two inch by four inch nominal stock.

(c) If the top rail is made of two right-angle pieces of 1-inch by 4-inch stock, posts are spaced on 8-foot centers, with 2-inch by 4-inch intermediate rail.

(2) For pipe railings:

(a) The posts and top and intermediate railings are at least 1-1/2 inches nominal diameter (outside diameter); and

(b) The posts are spaced on centers of eight feet or less.

(3) For structural steel railings:

(a) The posts and top and intermediate rails are of 2-inch by 2-inch by 3/8-inch angles or other metal shapes of equivalent bending strength; and

(b) The posts are spaced on centers of eight feet or less.

(4) Post anchors and framing parts for all railings are constructed so that the completed structure can withstand a load of at least two hundred pounds applied in any direction at any point on the top rail.

(5) Other types, sizes, and arrangements of railing construction that meet the following requirements are acceptable:

(a) The top rail is smooth;

(b) The top rail is between thirty-six and forty-two inches nominal above the floor, platform, runway, or ramp level;

(c) The railing is strong enough to withstand two hundred pounds of pressure on the top rail;

(d) The railing provides protection between the top rail and the floor, platform, runway, ramp, or stair treads, equivalent to that of a standard intermediate rail;

(e) There are no overhanging rail ends unless the overhang does not create a hazard; such as baluster railings, scrollwork railings, or paneled railings.

Note: The dimensions specified are based on the U.S. Department of Agriculture Wood Handbook, No. 72, 1955 (No. 1 (S4S) Southern Yellow Pine (Modulus of Rupture 7,400 psi)) for wood; ANSI G 41.5-1970, American National Standard Specifications for Structural Steel, for structural steel; and ANSI B 125.1-1970, American National Standard Specifications for Welded and Steamless Steel Pipe, for pipe.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-25027, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-25030 What requirements apply to toeboards? (1) Standard toeboard height is at least four inches nominal from its top edge to the level of the floor, platform, runway, or ramp. The toeboard must be securely fastened in place and with a maximum of 1/4 inch clearance above floor level. It must be made of any substantial material that is either solid or with openings that are a maximum of one inch in diameter.

(2) Where material is piled high enough that a standard toeboard does not provide protection, paneling from the floor to the intermediate rail, or to the top rail, must be provided.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-25030, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-25033 How must handrails and railings be constructed? (1) A handrail must have a horizontal part mounted directly on a wall or partition by brackets attached to the lower side of the handrail. The brackets must be attached to ensure that there is a smooth surface along the top and both sides of the handrail. The handrail must be rounded or otherwise provide an adequate handhold for anyone grasping it to avoid falling. The ends of the handrail should be turned in to the supporting wall or arranged to prevent a projection hazard.

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(2) Handrails must be a maximum of thirty-four inches high and at least thirty inches from the upper surface of the handrail to the surface of the tread in line with the face of the riser or to the surface of the ramp.

(3) The size of handrails must be:

(a) For hardwood, at least two inches in diameter.

(b) For metal pipe, at least 1-1/2 inches in diameter.

(4) Brackets must be spaced a maximum of eight feet apart.

(5) Handrail mounting must be strong enough to withstand a load of at least two hundred pounds applied in any direction at any point on the rail.

(6) All handrails and railings shall have a clearance of at least 1-1/2 inches between the handrail or railing and the wall or any other object.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-25033, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-25036 What materials may be used for floor opening covers? Floor opening covers must be made of any material that meets the following strength requirements:

(1) Trench or conduit covers and their supports, when located in plant roadways, must be designed to carry a truck rear-axle load of at least 20,000 pounds.

(2) Manhole covers and their supports, when located in plant roadways, must meet local standard highway requirements if any; otherwise, they must be designed to carry a truck rear-axle of at least 20,000 pounds.

(3) Other floor opening covers must be made of any material that can carry a truck rear-axle load of at least 20,000 pounds. Covers may project a maximum of one inch above the floor level if all edges are chamfered to a maximum angle with the horizontal of thirty degrees. All hinges, handles, bolts, or other parts must set flush with the floor or cover surface.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-25036, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-25039 How must skylight screens be constructed and mounted? Skylight screens must be constructed and mounted to withstand a load of at least two hundred pounds applied perpendicularly anywhere on the screen. Skylight screen must be constructed and mounted so that, under ordinary loads or impacts, they will not deflect downward enough to break the glass below them. They must be constructed of grillwork with openings a maximum of four inches long or of slatwork with openings a maximum of two inches wide and any length.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-25039, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-25042 What protection must an employer provide for wall openings? (1) Wall opening barriers (rails, rollers, picket fences, and half doors) must be constructed and mounted, to withstand a load of at least two hundred pounds applied in any direction (except upward) at any point on the top rail.

(2) Wall opening grab handles must be at least twelve inches long and must be mounted to give 1-1/2 inches clearance from the side framing of the wall opening. The

size, material, and anchoring of the grab handle must form a structure that can withstand a load of at least two hundred pounds applied in any direction at any point of the handle.

(3) Wall opening screens must be constructed and mounted to withstand a load of at least two hundred pounds applied horizontally anywhere on the near side of the screen. They must be of solid construction, of grillwork with openings a maximum of four inches long, or of slatwork with openings a maximum of two inches wide and any length.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-25042, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-260 Fixed industrial stairs.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-260, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-26003 What does this section cover? WAC 296-306A-260 covers the safe design and construction of fixed general industrial stairs. Fixed general industrial stairs includes interior and exterior stairs around machinery, tanks, and other equipment, and stairs leading to or from floors, platforms, or pits.

This section does not apply to stairs used for fire exits, to construction operations, to private buildings or residences, or to articulated stairs that are installed on floating roof tanks or on dock facilities, where the angle changes with the rise and fall of the base support.

Stairs of public and private buildings at loading or receiving docks, in maintenance areas, etc., or stairs that are used exclusively by employees, are considered "fixed industrial steps" and must meet these requirements.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-26003, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-26006 What definitions apply to this section? "Nose or nosing" means the part of a tread projecting beyond the face of the riser immediately below.

"Open riser" means the air space between the treads of stairways without risers.

"Platform" means an extended step or landing breaking a continuous run of stairs.

"Railing" means a vertical barrier erected along exposed sides of stairways and platforms to prevent people from falling. The top part of the railing usually serves as a handrail.

"Rise" means the vertical distance from the top of a tread to the top of the next higher tread.

"Riser" means the upright part of a step at the back of a lower tread and near the leading edge of the next higher tread.

"Stairs or stairway" means a series of steps. A series of steps and landings having three or more risers constitutes stairs or a stairway.

"Tread" means the horizontal part of a step.

"Tread run" means the horizontal distance from the leading edge of a tread to the leading edge of an adjacent tread.

"Tread width" means the horizontal distance from front to back of tread, including nosing.

(1997 Ed.)

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-26006, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-26009 Where are fixed stairs required? Fixed stairs must be provided for:

(1) Employee access from one structure level to another where operations require regular travel between levels.

(2) Employee access to operating platforms on any equipment that requires regular attention during operations.

(3) Employees that need daily access to elevations, or access at each shift, for purposes such as gauging, inspection, regular maintenance, etc., where:

(a) The work may expose employees to acids, caustics, gases, or other harmful substances; or

(b) Employees must normally carry tools or equipment by hand.

Note: This section does not prohibit the use of fixed ladders for access to elevated tanks, towers, and similar structures, overhead traveling cranes, etc., where the use of fixed ladders is common practice.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-26009, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-26012 Where are spiral stairs prohibited? Spiral stairways are prohibited except for special limited use and secondary access when a conventional stairway is not practical. Winding stairways may be installed on tanks and similar round structures where the diameter of the structure is a minimum of five feet.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-26012, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-26015 How strong must fixed stairs be? Fixed stairways must be designed and constructed to carry a load of five times the normal live load anticipated, and must be at least strong enough to carry safely a moving concentrated load of 1,000 pounds.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-26015, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-26018 How wide must fixed stairs be? Fixed stairways must be at least 22 inches wide.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-26018, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-26021 What angles may stairways be installed at? (1) Fixed stairs must be installed at angles to the horizontal of between thirty and fifty degrees. Any uniform combination of rise/tread dimensions may be used that will provide a stairway at an angle within the permissible range.

The following table lists examples of rise/tread dimensions that will produce a stairway within the permissible range. Rise/tread combinations are not limited to those in the table.

Angle to horizontal	Rise (in inches)	Tread run (in inches)
30°35'	6-1/2	11

32°08'	6-3/4	10-3/4
33°41'	7	10-1/2
35°16'	7-1/4	10-1/4
36°52'	7-1/2	10
38°29'	7-3/4	9-3/4
40°08'	8	9-1/2
41°44'	8-1/4	9-1/4
43°22'	8-1/2	9
45°00'	8-3/4	8-3/4
46°38'	9	8-1/2
48°16'	9-1/4	8-1/4
49°54'	9-1/2	8

(2) A permanent stairway may be installed at an angle above the fifty degree critical angle when space limitations require. Such installations (commonly called inclined ladders or ship's ladders) must have handrails on both sides and open risers. They must be capable of sustaining a live load of one hundred pounds per square foot with a safety factor of four. The following preferred and critical angles from the horizontal are recommended for inclined ladders and ship's ladders:

- (a) 35 to 60 degrees—Preferred angle from horizontal.
- (b) 60 to 70 degrees—Critical angle from horizontal.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-26021, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-26024 What requirements apply to stair treads? (1) When risers are used, each tread and the top landing of a stairway should have a nose extending 1/2 to one inch beyond the face of the lower riser.

(2) Noses should have an even leading edge.

(3) All treads must be reasonably slip-resistant and the nosings must be of nonslip finish. Welded bar grating treads without nosings are acceptable if the leading edge can easily be identified by employees descending the stairway and the tread is serrated or is nonslip.

(4) Rise height and tread width must be uniform throughout any flight of stairs including any foundation structure used as one or more treads of the stairs.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-26024, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-26027 What requirements apply to the length of stairways? Long flights of stairs, unbroken by landings or intermediate platforms, should be avoided. You should consider providing intermediate platforms where practical and for frequently used stairways. Stairway platforms must be at least as wide as the stairway and at least 30 inches long, measured in the direction of travel.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-26027, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-26030 What requirements apply to railings and handrails on fixed stairs? Standard railings must be provided on the open sides of all exposed stairways and stair platforms. Handrails must be provided on at least one side of closed stairways, preferably on the right side descending. Stair railings and handrails must be installed according to WAC 296-360A-250.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-26030, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-26033 What requirements apply to alternating tread-type stairs? "Alternating tread-type stairs" means stairs with a series of steps between 50 and 70 degrees from horizontal, attached to a center support rail in an alternating manner so that a user of the stairs never has both feet at the same level at the same time.

(1) Alternating tread-type stairs must be designed, installed, used, and maintained according to the manufacturer's specifications, and must have the following:

- (a) Stair rails on all open sides;
- (b) Handrails on both sides of enclosed stairs;
- (c) Stair rails and handrails that provide an adequate handhold for a user grasping it to avoid a fall;
- (d) A minimum of 17 inches between handrails;
- (e) A minimum width of 22 inches overall;
- (f) A minimum tread depth of 8 inches;
- (g) A minimum tread width of 7 inches; and
- (h) A maximum rise of 9 1/2 inches to the tread surface of the next alternating tread.

(2) Alternating tread-type stairs must have a maximum 20-foot continuous rise. Where more than a 20-foot rise is necessary to reach the top of a required stair, one or more intermediate platforms must be provided according to WAC 296-306A-26027.

(3) Stairs and platforms must be installed so the top landing of the alternating tread stair is flush with the top of the landing platform.

(4) Stair design and construction must sustain a load of at least five times the normal live load, and be at least strong enough to carry safely a moving concentrated load of 1,000 pounds.

(5) Treads must have slip-resistant surfaces.

(6) Where a platform or landing is used, the width must be at least as wide as the stair and at least 30-inches deep in the direction of travel. Stairs must be flush with the top of the landing platform.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-26033, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-26036 What other requirements apply to fixed stairs? (1) Vertical clearance above any stair tread to an overhead obstruction must be at least 7 feet measured from the leading edge of the tread.

(2) Stairs with treads less than 9 inches wide should have open risers.

(3) Open grating type treads are desirable for outside stairs.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-26036, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-270 Aerial manlift equipment.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-270, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-27005 What requirements apply to aerial manlift equipment? (1) We will accept safety factor test data on working or structural components from one of

the following as evidence that a manlift meets minimum safety requirements:

- (a) The manufacturer;
- (b) A competent testing laboratory;
- (c) A registered engineering firm; or
- (d) A registered engineer.

If, after use, it appears doubtful whether this equipment will meet the above requirements, we may require that tests be conducted, and we may order that you make corrections.

(2) All aerial manlifts must have working brake systems.

(3) Automatic apertures must be installed in the hydraulic systems of aerial manlifts to maintain the boom in position in case any part of the hydraulic pressure system fails.

(4) Controls must be guarded by partial enclosures to minimize accidental contact.

(5) The manufacturer's recommended maximum load limit must be posted conspicuously near the controls and must be kept in a legible condition.

(6) All critical hydraulic and pneumatic components must meet the provisions of ANSI A92.2-1969, Section 4.9 Bursting Safety Factor. Critical components are those which, in case of failure, would cause a free fall or free rotation of the boom. All noncritical components must have a bursting safety factor of at least two to one.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-27005, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-27010 What requirements apply to using aerial manlift equipment? (1) The manufacturer's instructional manual, if any, must be used to establish the proper operational sequences and maintenance procedures. If there is no manual, you must develop instructions. The instructions must be available for reference by operators.

(2) The assigned operator must make a daily visual inspection and perform the tests recommended by the manufacturer.

(3) Only employees qualified by training or experience may operate aerial manlifts.

(4) Employees must report defective aerial manlift equipment to you as soon as identified. Using defective equipment is prohibited when the defect may cause an accident.

(5) When moving to and from the job site, the basket of the manlift must be in the low position.

(6) Unsafe practices are prohibited, such as, sitting or standing on the basket edge, standing on material placed across the basket, or working from a ladder set inside the basket.

(7) The basket must not be rested on a fixed object so that the weight of the boom is supported by the basket.

(8) The employee and the aerial manlift equipment must maintain distance from high voltage lines according to WAC 296-306A-150.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-27010, filed 10/31/96, effective 12/1/96.]

Part P Guarding Power Transmission Machinery

WAC 296-306A-280 Guarding power transmission machinery.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-280, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-28002 What power transmission belts are covered by this section? WAC 296-306A-280 covers all types and shapes of power transmission belts.

Exception: The following power transmission belts are exempt from WAC 296-306A-280 when operating at 250 feet per minute or less:

- (1) Flat belts that are one inch wide or less.
- (2) Flat belts that are 2" wide or less and are free from metal lacings or fasteners.
- (3) Round belts that are 1/2" in diameter or less.
- (4) Single strand V-belts that are 13/32" wide or less.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-28002, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-28004 What does "guarded by location" mean? "Guarded by location" means that the location of a component eliminates potential hazards. A component seven feet or more above a working surface is considered guarded by location.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-28004, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-28006 What general requirements apply to machine guarding? (1) All power transmission components must be guarded according to the requirements of this section.

(2) You must protect employees from coming into contact with moving machinery parts by:

- (a) A guard or shield or guarding by location; or
- (b) A guardrail or fence whenever a guard or shield or guarding by location is infeasible.
- (3) Strength and design of guards.

(a) Guards must be designed and located to prevent inadvertent contact with the hazard.

(b) Unless otherwise specified, each guard and its supports must be strong enough to withstand the force that a 250 pound person would exert leaning on or falling against the guard.

(c) Guards must be securely fastened to the equipment or building.

(4) Shields, guards, and access doors that will prevent accidental contact with rotating machine parts on constant-running drives must be in place when the machine is running.

Exception: This requirement does not apply to combines when guards could create fire hazards.

"Constant-running drives" means drives that continue to rotate when the engine is running and all clutches are disengaged.

(5) A guard or shield on stationary equipment must be provided at the mesh point or pinch point where the chain or belt contacts the sprocket or pulley.

(6) Machines that will throw stock, material, or objects must be covered or provided with a device designed and constructed to minimize this action. (Machines such as rip saws, rotary mowers and beaters, rotary tillers are included in this classification.)

(7) When the periphery of the blades of a fan is less than 7 feet above the floor or working level, the blades must be guarded. The guard must have openings no larger than 1/2 inch.

(8) For requirements relating to the control of hazardous energy (lockout-tagout) see WAC 296-306A-320.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-28006, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-28008 What training must an employer provide for employees who use agricultural equipment? At the time of initial assignment and at least annually thereafter, you must instruct every employee in the safe operation and servicing of all equipment that the employee will use, including at least the following:

(1) Keep all guards in place when the machine is in operation.

(2) Only persons required for instruction or machine operation may ride on equipment, unless a passenger seat or other protective device is provided.

(3) Stop engine, disconnect the power source, and wait for all machine movement to stop before servicing, adjusting, cleaning, or unclogging the equipment.

Exception: When the machine must be running to be properly serviced or maintained, you must instruct employees in the steps and procedures necessary to safely service or maintain the equipment.

(4) Make sure everyone is clear of machinery before starting the engine, engaging power, or operating the machine.

(5) Lock out electrical power before performing maintenance or service on farmstead equipment.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-28008, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-28010 What requirements apply to machine controls? (1) If machine operation requires the presence of an operator on the machine, a "stop button" must be provided on the machine within reach of the operator.

(2) Power control devices must be marked to indicate the function and machine they control. "On" and "off" must be marked.

(3) "Stop" buttons must be red or orange. Each machine must have one or more stop buttons according to the working position of the operators.

(4) Power control devices must be located or guarded to prevent unexpected or accidental movement of the control. "Start" buttons must be recessed.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-28010, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-28012 What requirements apply to guarding steam pipes? (1) All steam pipes or pipes hot

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enough to burn a person (other than coil pipes, radiators for heating rooms or buildings, or pipes on portable steam engines and boilers) must be guarded with a standard safeguard, unless guarded by location.

(2) All exposed hot pipes within seven feet of the floor or working platform, or within 15 inches measured horizontally from stairways, ramps or fixed ladders, must be covered with insulating material or be guarded to prevent contact.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-28012, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-28014 What requirements apply to prime-mover guards? "Flywheels" include flywheels, balance wheels, and flywheel pulleys mounted and revolving on crankshaft of engine or other shafting.

"Prime movers" include steam, gas, oil, and air engines, motors, steam and hydraulic turbines, and other equipment used as a source of power.

(1) Unless guarded by location, flywheels must be guarded according to the following requirements:

(a) Guard enclosures are made of sheet, perforated, or expanded metal, or woven wire.

(b) Guard rails are between 15 and 20 inches from the rim. When a flywheel extends into a pit or is within 12 inches of the floor, a standard toeboard is provided.

(c) When the upper rim of a flywheel extends through a working floor, it is surrounded by a guardrail and toeboard.

(d) Exception: When a flywheel with a smooth rim 5 feet or less in diameter cannot be guarded by the above methods, you must guard by meeting the following requirements:

On the exposed side, cover the flywheel spokes with a disk that makes a smooth surface and edge, and provides for inspection. You may leave an open space, less than 4 inches wide, between the outside edge of the disk and the rim of the wheel, to turn the wheel over. If you use a disk, keys or other projections left uncovered by the projections shall be cut off or covered.

Note: This exception does not apply to flywheels with solid web centers.

(e) At the flywheel of a gas or oil engine, you may provide an adjustable guard for starting the engine or for running adjustment. A slot opening for a jack bar is permitted.

(f) For flywheels above working areas, you must install guards that are strong enough to hold the weight of the flywheel if the shaft or wheel mounting fails.

(2) Cranks and connecting rods, when exposed to contact, must be guarded according to WAC 296-306A-28046 and 296-306A-28048, or by a guardrail according to WAC 296-306A-28060.

(3) Tail rods or extension piston rods must be guarded according to WAC 296-306A-28046 and 296-306A-28048, or by a guardrail on the sides and end, with a clearance of between 15 and 20 inches when rod is fully extended.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-28014, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-28016 What requirements apply to guarding shafting? Revolving shafts must be guarded by a standard safeguard unless guarded by location.

(1) All shafting must be secured against excessive end movement.

(2) Guarding horizontal shafting.

(a) Unless guarded by location, all exposed parts of horizontal shafting, must be enclosed in a guard that covers the shafting completely or by a trough that covers the sides and top or sides and bottom of the shafting as location requires.

(b) Shafting under bench machines must be enclosed by a guard that covers the shafting completely or by a trough that covers the sides and top or sides and bottom of the shafting as location requires. The sides of the trough must extend to at least 6 inches from the underside of table. If shafting is near the floor, the trough must extend to at least 6 inches from the floor. In every case, the sides of trough must extend at least 2 inches beyond the shafting or projection.

Exception: Maintenance runways are exempt from this requirement. "Maintenance runway" means any permanent runway or platform used for oiling, maintenance, running adjustment, or repair work, but not for passageway.

(3) Unless guarded by location, vertical and inclined shafting must be enclosed according to WAC 296-306A-28046 and 296-306A-28050 through WAC 296-306A-28060.

Exception: Maintenance runways are exempt from this requirement.

(4) Projecting shaft ends.

(a) Projecting shaft ends must have a smooth edge and end and must not project more than one-half the diameter of the shaft unless guarded by nonrotating caps or safety sleeves.

(b) Unused keyways must be filled up or covered.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-28016, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-28018 What requirements apply to guarding pulleys? (1) Unless guarded by location, pulleys must be guarded according to WAC 296-306A-28046 and 296-306A-28050 through WAC 296-306A-28060. Pulleys serving as balance wheels (e.g., punch presses) on which the point of contact between belt and pulley is more than 6 feet 6 inches from the floor or platform may be guarded with a disk covering the spokes.

(2) If the distance to the nearest fixed pulley, clutch, or hanger is equal to or less than the width of the belt, then you must provide a guide to prevent the belt from leaving the pulley on the side where insufficient clearance exists.

(3) Where there are overhanging pulleys on line, jack, or countershafts with no bearing between the pulley and the outer end of the shaft, you should provide a guide to prevent the belt from running off the pulley.

(4) Pulleys with cracks, or pieces broken out of rims are prohibited.

(5) Pulleys must be designed and balanced for the operating speed.

(6) Composition or laminated wood pulleys must not be installed where they are likely to deteriorate.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-28018, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-28020 What requirements apply to guarding horizontal belt, rope, and chain drives? "Belts" include all power transmission belts, such as flat belts, round belts, V-belts, etc., unless otherwise specified.

(1) Where both runs of horizontal belts are 7 feet or less from the floor level, the guard must extend to at least 15 inches above the belt or to a standard height. (See Table P-1.)

Exception: Where both runs of a horizontal belt are 42 inches or less from the floor, the belt must be fully enclosed according to WAC 296-306A-28046 and 296-306A-28050 through WAC 296-306A-28060.

(2) In power development rooms, a guardrail may be used instead of the guard.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-28020, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-28022 What requirements apply to guarding overhead horizontal belt, rope, and chain drives? (1) Unless guarded by location, overhead horizontal belts must be guarded on the sides and bottom according to WAC 296-306A-28054.

(2) Unless guarded by location, horizontal overhead belts must be guarded for their entire length when:

(a) Located over passageways or work places and traveling 1,800 feet or more per minute.

(b) The center to center distance between pulleys is 10 feet or more.

(c) The belt is 8 inches wide or more.

(3) Where the upper and lower runs of horizontal belts are located so that employees can pass between them, the passage must be either:

(a) Completely barred according to WAC 296-306A-28046 and 296-306A-28050 through WAC 296-306A-28060; or

(b) In a passage that employees must use, there must be a platform over the lower run guarded on either side by a railing that is completely filled in with wire mesh or other filler, or by a solid barrier. The upper run must be guarded to prevent contact by the employee or by objects carried by the employee.

(4) Overhead chain and link belt drives must be guarded according to the same requirements as overhead horizontal belts.

(5) American or continuous system rope drives located where the condition of the rope (particularly the splice) cannot be constantly and conveniently observed, must have an alarm (preferably electric-bell type) that will warn when the rope begins to fray.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-28022, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-28024 What requirements apply to guarding vertical and inclined belts? (1) Vertical and inclined belts must be guarded according to WAC 296-306A-28044 and 296-306A-28050 through WAC 296-306A-28060.

(2) All guards for inclined belts must provide a minimum clearance of 7 feet between belt and floor at any point outside of the guard.

(3) A vertical or inclined belt may be guarded with a nip-point belt and pulley guard, if it is:

(a) 2-1/2 inches wide or less;

(b) Running at a speed of less than one thousand feet per minute; and

(c) Free from metal lacings or fastenings.

"Nip-point belt and pulley guard" means a device that encloses the pulley and has rounded or rolled edge slots through which the belt passes.

(4) Vertical belts running over a lower pulley more than seven feet above floor or platform must be guarded according to the same requirements as horizontal overhead belts, if the belt is:

(a) Located over passageways or work places and traveling 1,800 feet or more per minute;

(b) Eight inches wider or more.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-28024, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-28026 What requirements apply to guarding cone-pulley belts? (1) The cone belt and pulley must have a belt shifter that adequately guards the nip point of the belt and pulley. If the frame of the belt shifter does not adequately guard the nip point of the belt and pulley, the nip point must be protected by a vertical guard in front of the pulley that extends at least to the top of the largest step of the cone.

"Belt shifter" means a device for mechanically shifting belts from tight to loose pulleys or vice versa, or for shifting belts on cones of speed pulleys.

(2) If the belt is endless or laced with rawhide laces, and no belt shifter is used, the belt may be guarded according to the following:

(a) The nip point of the belt and pulley is protected by a nip point guard in front of the cone;

(b) The guard extends at least to the top of the largest step of the cone; and

(c) The guard is formed to show the contour of the cone.

(3) If the cone is less than 3 feet from the floor or working platform, the cone pulley and belt must be guarded to a height of 3 feet regardless of whether the belt is endless or laced with rawhide.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-28026, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-28028 What requirements apply to guarding belt tighteners? (1) Suspended counterbalanced belt tighteners and all components must be substantially constructed and securely fastened. The bearings must be securely capped. You must provide a mechanism to prevent the tightener from falling in case the belt breaks.

(2) Unless guarded by location, suspended counterweights must be encased to prevent accident.

(3) Belt tighteners used for starting and stopping machinery, unless held by gravity in the "off" or "out of service" position, must have a mechanism that will hold the belt tightener away from the belt when not in use. The

mechanism must automatically grip, latch or otherwise fasten itself to and hold the belt tightener in "off" or "out of service" position until released by hand.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-28028, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-28030 What requirements apply to guarding gears, sprockets, and chains? (1) Gears must be guarded by one of the following methods:

(a) A complete enclosure; or

(b) A standard guard according to WAC 296-306A-28050 through 296-306A-28060, at least 7 feet high extending 6 inches above the mesh point of the gears; or

(c) A band guard covering the face of gear. The guard must have flanges extended inward beyond the root of the teeth on the exposed side or sides. If a part of the train of gears guarded by a band guard is less than 6 feet from the floor, the gear must be guarded by a disk guard or by a complete enclosure at least 6 feet tall.

(2) Hand-operated gears used only to adjust hand-powered machine parts may be unguarded. However, we recommend guarding these gears.

(3) Unless guarded by location, all sprocket wheels and chains must be enclosed. Where the drive extends over other machine or working areas, you must provide protection against falling parts.

Exception: This section does not apply to manually operated sprockets.

(4) When gears require frequent oiling, you must provide openings with hinged or sliding self-closing covers. All points not readily accessible must have oil feed tubes if lubricant is added while machinery is in motion.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-28030, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-28032 What requirements apply to guarding friction drives? When exposed to contact, the driving point of all friction drives must be guarded. All arm or spoke friction drives and all web friction drives with holes in the web must be entirely enclosed. When exposed to contact, all projecting belts on friction drives must be guarded.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-28032, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-28034 What requirements apply to guarding keys, set screws, and other projections? (1) All projecting keys, set screws, and other projections in revolving parts must be removed, or made flush, or guarded by metal covers.

(2) Projections, such as exposed bolts, keys, or set screws that are part of sprockets, grooved pulleys or pulleys on stationary equipment must be shielded unless guarded by location.

Exception: This section does not apply to keys or set screws within gear or sprocket casings or other enclosures, nor to keys, set screws, or oilcups in hubs of pulleys less than 20 inches in diameter where they are within the plane of the rim of the pulley.

Note: We recommend that you not use projecting set screws or oilcups in any revolving pulley or part of machinery.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-28034, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-28036 What requirements apply to guarding collars and couplings? (1) All revolving collars, including split collars, must be cylindrical. Screws or bolts used in collars must not project beyond the largest periphery of the collar.

(2) Shaft couplings must be constructed to prevent hazard from bolts, nuts, set screws, or revolving surfaces. Bolts, nuts, and set screws are permitted where they are covered with safety sleeves or where they are used parallel with the shafting and are countersunk or where they do not extend beyond the flange of the coupling.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-28036, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-28038 Must self-lubricating bearings be used? We recommend that you use self-lubricating bearings. All drip cups and pans must be securely fastened.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-28038, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-28040 What requirements apply to guarding clutches, cutoff couplings, and clutch pulleys? (1) Unless guarded by location, clutches, cutoff couplings, or clutch pulleys with projecting parts must be enclosed by a stationary guard constructed according to WAC 296-306A-28046. You may use a "U" type guard.

(2) In engineer rooms, a guardrail, preferably with toeboard, may be used instead of the guard if the room is only occupied by engineer room attendants.

(3) A bearing support next to a friction clutch or cutoff coupling must have self-lubricating bearings that require infrequent maintenance.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-28040, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-28042 What requirements apply to guarding belt shifters, clutches, shippers, poles, perches, and fasteners? "Belt pole" (sometimes called a "belt shipper" or "shipper pole") means a device used in shifting belts on and off fixed pulleys on line or countershaft where there are no loose pulleys.

(1) Tight and loose pulleys must have a permanent belt shifter with a mechanical means to prevent the belt from creeping from loose to tight pulley.

(2) Belt shifter and clutch handles must be rounded. They must be as far as possible from danger of accidental contact, but within easy reach of the operator. Where belt shifters are not directly over a machine or bench, the handles must be cut off 6 feet 6 inches above floor level.

(3) All belt and clutch shifters of the same type in each shop should move in the same direction to stop machines, i.e., either all right or all left.

Exception: This requirement does not apply to a friction clutch on a countershaft carrying two clutch pulleys with open and crossed belts. In this case the shifter handle has three positions and the machine is at a standstill when the clutch handle is in the neutral or center position.

(4) When belt poles must be used as a substitute for mechanical shifters, they must be big enough for employees to grasp them securely. Poles must be smooth and preferably of straight grain hardwood, such as ash or hickory. The edges of rectangular poles should be rounded. Poles should extend from the top of the pulley to within approximately 40 inches of the floor or working platform.

(5) Where loose pulleys or idlers are not practical, belt perches such as brackets, rollers, etc., must be used to keep idle belts away from the shafts. Perches should be substantial and designed for safe belt shifting.

(6) Belts that must be shifted by hand and belts within seven feet of the floor or working platform that are not guarded according to WAC 296-306A-28046 must not be fastened with metal, nor with any other fastening that creates a hazard.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-28042, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-28044 What materials must be used for standard guards? (1) Standard guards must be made of the following materials:

- (a) Expanded metal;
- (b) Perforated or solid sheet metal;
- (c) Wire mesh on a frame of angle iron; or
- (d) Iron pipe securely fastened to the floor or the frame of the machine.

(2) Wire mesh should have wires that are securely fastened at every cross point either by welding, soldering, or galvanizing.

Exception: Diamond or square wire mesh made of No. 14 gauge wire, 3/4-inch mesh or heavier is exempt from this requirement.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-28044, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-28046 How must standard guards be manufactured? (1) Guards must be free from burrs, sharp edges, and sharp corners.

(2) Expanded metal, sheet or perforated metal, and wire mesh must be securely fastened to the frame by one of the following methods:

- (a) Rivets or bolts spaced not more than five inches center to center. In case of expanded metal or wire mesh, metal strips or clips must be used to form a washer for rivets or bolts.
- (b) Welding to frame every four inches.
- (c) Weaving through channel or angle frame, or, if No. 14 gauge 3/4-inch mesh or heavier is used, by bending entirely around rod frames.

(d) To fill openings in pipe railing with expanded metal, wire mesh, or sheet metal, make the filler material into panels with rolled edges or edges bound with "V" or "U" edging. The edging must be of at least No. 24 gauge sheet metal fastened to the panels with bolts or rivets spaced a maximum of 5 inches center to center. The bound panels must be fastened to the railing by sheet-metal clips spaced a maximum of 5 inches center to center.

(e) Diamond or square mesh made of crimped wire fastened into channels, angle iron, or round-iron frames may also be used as a filler in guards. Size of mesh must correspond to Table P-1.

(3) Where guard design requires filler material greater than 12 square feet, additional frame members must be provided to ensure that the panel area is a maximum of 12 square feet.

(4) All joints of framework must be as strong as the material of the frame.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-28046, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-28048 What requirements apply to disk, shield, and U-guards? (1) A disk guard must have a sheet-metal disk of at least No. 22 gauge fastened by U-bolts or rivets to the spokes of pulleys, flywheels, or gears. To prevent contact with sharp edges of the disk, the edge must be rolled or wired. In all cases, the nuts must have locknuts on the unexposed side of the wheel.

(2) A shield guard must have a frame filled in with wire mesh or expanded, perforated, or solid sheet metal.

(3) If the shield area is less than six square feet, the wire mesh or expanded metal may be fastened in a framework of 3/8-inch solid rod, 3/4-inch by 3/4-inch by 1/8-inch angle iron, or a metal construction of equivalent strength. Metal shields may have edges entirely rolled around a 3/8-inch solid iron rod.

(4) A U-guard consisting of a flat surface with edge members must cover the under surface and lower edge of a belt, multiple chain, or rope drive. It must be constructed of materials specified in Table P-1, and must meet the requirements of WAC 296-306A-28054 through 296-306A-28058. Edges must be smooth and, if the size of the guard requires, be reinforced by rolling, wiring, or by binding with angle or flat iron.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-28048, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-28050 What materials must be used for guards? The materials and dimensions specified in this section apply to all guards. The materials and dimensions specified are minimum requirements. You may choose to provide stronger guards.

Exception: Horizontal overhead belts, rope, cable, or chain guards more than 7 feet above floor, or platform must meet the requirements outlined in Table P-2.

(1) The framework of all guards must have minimum dimensions of 1-inch by 1-inch by 1/8-inch for angle iron, 3/4-inch inside diameter for metal pipe, or metal construction of equivalent strength.

Exception: Guards thirty inches tall or less with a total surface area of ten square feet or less may have a framework of 3/8-inch solid rod, 3/4-inch by 3/4-inch by 1/8-inch angle iron, or metal construction of equivalent strength. The filling material must correspond to the requirements of Table 1.

(a) All guards must be rigidly braced every 3 feet of their height to some fixed part of machinery or building structure. Where a guard is exposed to contact with moving equipment additional strength may be necessary.

(b) The framework for all guards fastened to the floor or working platform and without other support or bracing must consist of 1-1/2-inch by 1-1/2-inch by 1/8-inch angle iron, metal pipe of 1-1/2-inch inside diameter, or metal construction of equivalent strength. All rectangular guards

must have at least four upright frame members that extend to the floor and are securely fastened. Cylindrical guards must have at least three supporting members that extend to the floor.

(2) Where guards are exposed to unusual wear, deterioration, or impact, heavier material and construction should be used to protect against the specific hazards involved.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-28050, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-28052 When may wood guards be used? Wood guards may be used where fumes would cause rapid deterioration of metal guards and outdoors where extreme cold or extreme heat make metal guards and railings undesirable.

(1) Wood must be sound, tough, and without loose knots.

(2) Guards must be made of planed lumber not less than 1-inch rough board measure, with rounded edges and corners.

(3) Wood guards must be securely fastened together with wood screws, hardwood dowel pins, bolts, or rivets.

(4) Wood guards must be equal in strength and rigidity to metal guards specified in WAC 296-306A-28050 and Table P-1.

Note: Requirements for the construction of standard wood railings are in WAC 296-306A-28060.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-28052, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-28054 What materials may be used for guarding horizontal overhead belts? (1) Guards for horizontal overhead belts must run the entire length of the belt and follow the line of the pulley to the ceiling or extend to the nearest wall.

Exception: Where belts are located so that it is impractical to extend the guard to wall or ceiling, the guard must completely enclose the top and bottom runs of the belt and the face of pulleys.

(2) The guard and its supporting parts must be securely fastened to the wall or ceiling by gimlet-point lag screws or through bolts. In masonry, expansion bolts must be used. We recommend using bolts placed horizontally through floor beams or ceiling rafters.

(3) When necessary, suitable reinforcement must be provided for the ceiling rafters or overhead floor beams to sustain safely the weight and stress imposed by the guard.

(4) The interior surface of all guards must be smooth and free from projections.

Exception: Where construction demands it, protruding shallow roundhead rivets may be used.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-28054, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-28056 What clearance must be maintained between guards and power transmission machinery? (1) Overhead belt guards must be at least one-quarter wider than the belt they protect, with a maximum clearance of 6 inches on each side. Overhead rope-drive and

block and roller-chain-drive guards must be at least six inches wider than the drive on each side.

(2) Overhead silent chain-drive guards with the chain held on sprockets must have side clearance of:

(a) On drives of 20-inch centers or less, at least 1/4-inch from the nearest moving chain part, and

(b) On drives of over 20-inch centers, a minimum of 1/2-inch from the nearest moving chain part.

(3) Table 2 gives the sizes of materials and construction specifications for guards for belts that are 10 inches wide or more. All materials for overhead belt guards must be at least the size specified in Table 2 for belts 10 to 14 inches wide, even if the overhead belt is less than 10 inches wide. However, No. 20 gauge sheet metal may be used as a filler on guards for belts less than 10 inches wide. Expanded metal, because of the sharp edges, should not be used as a filler in horizontal belt guards.

(4) For clearance between guards and belts, ropes, or chains see Table P-2.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-28056, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-28058 How must overhead rope and chain-drive guards be constructed? (1) Overhead-rope and chain-drive guard construction must meet the requirements for overhead-belt guard construction of similar width.

Exception: The filler material must be solid, according to Table P-2, unless fire hazard demands the use of open construction.

(2) A side guard member of the same solid filling material should extend 2 inches above the level of the lower run of the rope or chain drive and 2 inches within the periphery of the pulleys that the guard encloses, forming a trough.

(3) The side filler members should be reinforced on the edges with 1-1/2-inch by 1/4-inch flat steel, riveted to the filling material at 8 inch centers or less. The reinforcing

strip should be fastened or bolted to all guard supporting members with at least one 3/8-inch rivet or bolt at each intersection, and the ends should be secured to the ceiling with lag screws or bolts.

(4) The filling material must be fastened to the framework of the guard and the filler supports by 3/16-inch rivets spaced on 4-inch centers. Measure the width of a multiple drive from the outside of the first to the outside of the last rope or chain in the group accommodated by the pulley.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-28058, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-28060 What materials must be used for guardrails and toeboards? (1) A guardrail must be 42 inches tall, with a midrail between the top rail and the floor.

(2) Posts must be 8 feet apart or less. They must be permanent and substantial, smooth, and free from protruding nails, bolts, and splinters. If made of pipe, the post must be at least 1-1/4 inches inside diameter. If posts are made of metal shapes or bars, the section must be as strong as posts made of 1-1/2 by 1-1/2 by 3/16-inch angle iron. If posts are made of wood, the posts must be at least 2 by 4 inches. The upper rail must be 2 by 4 inches, or two 1 by 4 inch strips, one at the top and one at the side of the posts. The midrail must be at least 1 by 4 inches.

(3) The rails (metal shapes, metal bars, or wood), should be on the side of the posts that gives the best protection and support. Where panels are fitted with expanded metal or wire mesh (as noted in Table 1) the middle rails may be omitted. Where guard is exposed to contact with moving equipment, additional strength may be necessary.

(4) Toeboards must be at least 4 inches tall, of wood, metal, or metal grill of a maximum 1-inch mesh. Toeboards at flywheel pits should be placed as close to edge of the pit as possible.

Table P-1
TABLE OF STANDARD MATERIALS AND DIMENSIONS

Material	Clearance from moving part at all points (inches)	Largest mesh or opening allowable (inches)	Minimum gauge (U.S. Standard) or thickness (inches)	Minimum height of guard from floor or platform level (feet)
<i>Woven wire</i>	Under 2	3/8	No. 16	7
	2-4	1/2	No. 16	7
	Under 4	1/2	No. 16	7
	4-15	2	No. 12	7
<i>Expanded metal</i>	Under 4	1/2	No. 18	7
	4-15	2	No. 13	7
<i>Perforated metal</i>	Under 4	1/2	No. 20	7
	4-15	2	No. 14	7
<i>Sheet metal</i>	Under 4		No. 22	7
	4-15		No. 22	7
<i>Wood or metal strip crossed</i>	Under 4	3/8	Wood 3/4 Metal No. 16	7
	4-15	2	Wood 3/4 Metal No. 16	7
<i>Wood or metal strip not crossed</i>	Under 4	1/2 width	Wood 3/4 Metal No. 16	7
	4-15	1 width	Wood 3/4 Metal No. 16	7
<i>Standard rail</i>	Min. 15 Max. 20			

Table P-2
HORIZONTAL OVERHEAD BELTS, ROPES, AND CHAINS
7 FEET OR MORE ABOVE FLOOR OR PLATFORM

	Width 0"-14" inclusive	Material
MEMBERS		
Framework	1 1/2"x1 1/2"x1/4"	Angle iron
Filler (belt guards)	1 1/2"x3/16"	Flat iron
Filler and vertical side member	No. 20 A.W.G.	Solid sheet metal
Filler supports	2"x5/16" flat iron	Flat and angle
Guard supports	2"x5/16"	Flat iron
FASTENINGS		
Filler supports to framework	(2) 3/16"	Rivets
Filler flats to supports (belt guards)	(1) 5/16"	Flush rivets
Filler to frame and supports (chain guards)	3/16"	Rivets spaced
Guard supports to framework	(2) 3/6"	Rivets or bolts
Guard and supports to overhead ceiling	1/4"x3 1/2" lag screws or 1/2" bolts	Lag screws or bolts
DETAILS--SPACING, ETC.		
Width of guards	One-quarter wider than belt, rope, or chain drive	
Spacing between filler supports	20" center to center	
Spacing between filler flats (belt guards)	2" apart	
Spacing between guard supports	36" center to center	
OTHER BELT GUARD FILLING PERMITTED		
Sheet metal fastened as in chain guards	No. 20 A.W.G.	Solid or perforated
Woven wire, 2" mesh	No. 12 A.W.G.	
CLEARANCE FROM OUTSIDE OF BELT, ROPE, OR CHAIN DRIVE TO GUARD		
Distance center to center of shafts	Up to 15' inclusive	Over 40'
Clearance from belt, or chain to guard	16"	120"

	Width over 14" to 24" inclusive	Material
MEMBERS		
Framework	2"x2"x5/16"	Angle iron
Filler (belt guards)	2"x3/16"	Flat iron
Filler and vertical side member	No. 18 A.W.G.	Solid sheet metal
Filler supports	2"x3/8" flat iron	Flat and angle
Guard supports	2"x3/8"	Flat iron
FASTENINGS		
Filler supports to framework	(2) 3/6"	Rivets
Filler flats to supports (belt guards)	(1) 5/16"	Flush rivets
Filler to frame and supports (chain guards)	8" centers on sides and 4" centers on bottom	
Guard supports to framework	(2) 7/16"	Rivets or bolts
Guard and supports to overhead ceiling	5/8"x4" lag screws or 5/8" bolts	Lag screws or bolts
DETAILS--SPACING, ETC.		
Width of guards		(NEED INFO HERE)
Spacing between filler supports		16" C. to C
Spacing between filler flats (belt guards)		2 1/2" apart
Spacing between guard supports		36" C. to C
OTHER BELT GUARD FILLING PERMITTED		
Sheet metal fastened as in chain guards	No. 18 A.W.G.	Solid or perforated
Woven wire, 2" mesh	No. 10 A.W.G.	
CLEARANCE FROM OUTSIDE OF BELT, ROPE, OR CHAIN DRIVE TO GUARD		
Distance center to center of shafts	Over 15' to 25'	Over 40' inclusive
Clearance from belt, or chain to guard	10"	20"
	Width over 24"	Material
MEMBERS		
Framework	3"x3"x3/8"	Angle iron
Filler (belt guards)	2"x5/16"	Flat iron
Filler and vertical side member	No. A.W.G.	Solid sheet metal
Filler supports	2 1/2"x2 1/2"x1/4" angle	Flat and angle
Guard supports	2 1/2"x3/8"	Flat iron
FASTENINGS		
Filler supports to framework	(3) 1/2"	Rivets
Filler flats to supports (belt guards)	(2) 3/8"	Flush rivets
Filler to frame and supports (chain guards)	(NEED INFO HERE)	(NEED INFO HERE)
Guard supports to frame work	(2) 5/8"	Rivets or bolts
Guard and supports to overhead ceiling	3/4" x 6" lag screws or 3/4" bolts	Lag screws or bolts
DETAILS--SPACING, ETC.		
Width of guards		(NEED INFO HERE)
Spacing between filler supports		16" C. to C.
Spacing between filler flats (belt guards)		4" apart
Spacing between guard supports		36" C. to C.
OTHER BELT GUARD FILLING PERMITTED		
Sheet metal fastened as in chain guards	No. 18 A.W.G.	Solid or perforated
Woven wire, 2" mesh	No. 8 A.W.G.	
CLEARANCE FROM OUTSIDE OF BELT, ROPE, OR CHAIN DRIVE TO GUARD		
Distance center to center of shafts	Over 25' to 40' inclusive	Over 40'
Clearance from belt, or chain to guard	15"	20"

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-28060, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-28062 How must shafting be maintained? (1) Shafting must be kept in alignment, and free from rust and excess oil or grease.

(2) Where explosives, explosive dusts, flammable vapors or flammable liquids exist, guards must take into account the hazard of static sparks from shafting.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-28062, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-28064 How must pulleys be maintained? (1) Pulleys must be kept in proper alignment to prevent belts from running off.

(2) Any pulley carrying a nonshifting belt should have a crowned face.

(3) Cast-iron pulleys should be tested frequently with a hammer to detect cracks in rim or spokes. The sound is different depending on whether the belt is or is not on the pulley.

(4) Split pulleys should be inspected to be sure that all bolts holding together the sections of the pulley are tight.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-28064, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-28066 How must belts be maintained? (1) Quarter-twist belts without an idler can be used on drives running in one direction only. They will run off a pulley when direction is reversed.

(2) You must inspect belts, lacings, and fasteners to be sure they are kept in good repair.

(3) Dressing should not be applied when the belt or rope is in motion; but, when necessary, it should be applied where belts or rope leave the pulley, not where they approach. The same precautions apply to lubricating chains. In the case of V-belts, belt dressing is neither necessary nor advisable.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-28066, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-28068 How must other equipment be maintained? (1) You must inspect all power-transmission equipment at least every 60 days and ensure that it is kept in good working condition at all times.

(2) Bearings must be kept in alignment and properly adjusted.

(3) Hangers must be inspected to ensure that all supporting bolts and screws are tight and that supports of hanger boxes are adjusted properly.

(4) The oilers must wear tightfitting clothing and should use cans with long spouts to keep their hands out of danger. Machinery must be oiled when not in motion, wherever possible.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-28068, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-290 Auger conveying equipment.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-290, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-29005 What requirements apply to auger conveying equipment? "Augers" means screw

conveyors and related accessories designed primarily for conveying agricultural materials on farms.

(1) Power take-off shafts must be guarded according to WAC 296-306A-28046.

(2) All augers must be covered or guarded when exposed to contact.

(3) You must ensure that each sweep auger has its top half shielded by a guard. All guard openings must be no larger than 4 3/4 inches across.

(4) You must ensure that the exposed auger at the hopper and the intake is guarded or designed to prevent accidental contact with the rotating inlet area. The guard must extend at least 2 1/2 inches above and below the exposed auger. Openings in the guard, for the free flow of material, must be no larger than 4 3/4 inches across and must be strong enough to support 250 pounds at mid span.

(5) The hand raising winch must have a control that will hold the auger at any angle, and that will only respond to the control. You must ensure that the operator is able to lower the auger without disengaging the control. The maximum force required on the handle to raise or lower the auger manually must be 50 pounds.

(6) The wire rope lifting pulleys must be grooved to fit the wire rope used.

(7) In order to avoid separation, you must provide a positive restraint between the auger tube and the under-carriage lifting arm. You must provide stops that restrict the maximum raised angle and minimum lowered angle.

(8) Wire ropes (cables) must be rust resistant and selected for the design load and service intended.

(9) You must provide the auger operator with service and operation instructions that include safe operation and servicing practices.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-29005, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-29010 What other requirements apply to auger conveying equipment manufactured after October 25, 1976? You must ensure that auger conveying equipment manufactured after October 25, 1976, is guarded as follows:

(1) Sweep-arm material-gathering mechanisms used on the top surface of materials within silo structures are guarded. The lower or leading edge of the guard is no more than 12 inches above the material surface and no less than 6 inches in front of the leading edge of the rotating member of the gathering mechanism. The guard is parallel to and extends the fullest practical length of the material gathering mechanism.

(2) Exposed auger flighting on portable grain augers is guarded with either grating type guards or solid baffle style covers as follows:

(a) The largest dimensions or openings in grating type guards through which materials flow is 4-3/4 inches. The opening area is a maximum of 10 square inches. The opening is least 2-1/2 inches from the rotating flighting.

(b) Slotted openings in solid baffle style covers are a maximum of 1-1/2 inches wide, or less than 3-1/2 inches from the exposed flighting.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-29010, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-300 Guarding farmstead equipment.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-300, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-30003 What does this section cover? WAC 296-306A-300 applies to the guarding and care of farmstead equipment.

"Farmstead equipment" means agricultural equipment normally used in a stationary manner. This includes, but is not limited to, materials handling equipment and accessories for such equipment whether or not the equipment is an integral part of a building.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-30003, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-30006 How must power takeoff shafts of farmstead equipment be guarded? (1) You must ensure that all power takeoff shafts, including rear-mounted, mid-mounted or side-mounted shafts, are guarded either by a master shield or by other protective guarding. The master shield must be strong enough to prevent damaging the shield when a 250-pound operator mounts or dismounts the tractor using the shield as a step.

(2) Power takeoff driven equipment must be guarded to prevent employee contact with rotating parts of the power drive system. Where power takeoff driven equipment requires removal of the tractor master shield, the equipment must also include protection from any portion of the tractor power takeoff shaft that protrudes from the tractor.

(3) Signs must be placed at prominent locations on power takeoff driven equipment specifying that power drive system safety shields must be kept in place.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-30006, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-30009 How must other power transmission components of farmstead equipment be guarded? (1) The mesh or nip-points of all power driven gears, belts, chains, sheaves, pulleys, sprockets, and idlers must be guarded.

(2) All revolving shafts, including projections such as bolts, keys, or set screws, must be guarded.

Exception: The following may be unguarded:

(a) Smooth shafts and shaft ends (without any projecting bolts, keys, or set screws), revolving at less than 10 RPM, on feed handling equipment used on the top surface of materials in bulk storage facilities.

(b) Smooth shaft ends protruding less than one-half the outside diameter of the shaft and its locking means.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-30009, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-30012 How must functional components of farmstead equipment be guarded? The following functional components must be shielded to a degree consistent with the intended function and operator's vision of the component:

- Snapping or husking rolls;
- Straw spreaders and choppers;

- Cutterbars;
- Flail rotors;
- Rotary beaters;
- Mixing augers;
- Feed rolls;
- Rotary tillers; and
- Similar units that must be exposed for proper function.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-30012, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-30015 When may guards be removed on farmstead equipment? (1) Guards, shields and access doors must be in place when the equipment is in operation.

(2) Where removal of a guard or access door will expose an employee to any component that continues to rotate after the power is disengaged, you must provide in the immediate area, a safety sign warning the employee:

(a) To look and listen for evidence of rotation; and

(b) To refrain from removing the guard or access door until all components have stopped.

(3) On equipment manufactured after October 25, 1976, a readily visible or audible warning of rotation is required.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-30015, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-30018 What requirements apply to electrical control for maintaining and servicing farmstead equipment? (1) You must ensure that only the employee maintaining or servicing equipment has control of the electrical power source by:

(a) Providing an exclusive, positive locking means on the main switch that can be operated only by the employee performing the maintenance or service; or

(b) For material handling equipment in a bulk storage structure, by providing on the equipment an electrical or mechanical means to disconnect the power. Minimum lockout means must meet the requirements of WAC 296-306A-320.

(2) All circuit protection devices, including those that are an integral part of a motor, must have a manual reset, except where:

(a) A manual reset is infeasible because of the nature of the operation, distances involved, and the amount of time normally spent by employees in the area of the affected equipment;

(b) An electrical disconnect switch is available to the employee within fifteen feet of the equipment being maintained or serviced; and

(c) A sign, prominently posted near each hazardous component, warns the employee that unless the electrical disconnect switch is utilized, the motor could automatically reset while the employee is working on the hazardous component.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-30018, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-30021 What additional guarding requirements apply to farmstead equipment? (1) You must ensure that carton or bag stitching machines are

properly safeguarded to prevent anyone from coming in contact with the stitching head and other pinch or nip points.

(2) The point of operation of all machines must be guarded. The guard must be designed and constructed to prevent the operator from having any part of the body in the danger zone during the operating cycle.

Note: The distance from the point-of-operation guards to the danger line depends on the size of the opening. The required distances are outlined in the table below:

Guarding line or distance of opening from point of operation hazard (inches)	Maximum width of opening (inches)
1/2 to 1 1/2	1/4
1 1/2 to 2 1/2	3/8
2 1/2 to 3 1/2	1/2
3 1/2 to 5 1/2	5/8
5 1/2 to 6 1/2	3/4
6 1/2 to 7 1/2	7/8
7 1/2 to 12 1/2	1 1/4
12 1/2 to 15 1/2	1 1/2
15 1/2 to 17 1/2	1 7/8
17 1/2 to 31 1/2	2 1/8

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-30021, filed 10/31/96, effective 12/1/96.]

Part Q Control of Hazardous Energy (Lockout-tagout)

WAC 296-306A-320 Control of hazardous energy (lockout-tagout).

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-320, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-32001 What does this section cover? (1) WAC 296-306A-320 covers the servicing and maintenance of machines and equipment in which the start up of the machine or equipment or release of stored energy could cause injury to employees. This standard establishes minimum performance requirements for the control of such hazardous energy.

(2) Normal production operations are not covered by this standard. Servicing and/or maintenance that takes place during normal production operations is covered by this standard only if:

(a) An employee is required to remove or bypass a guard or other safety device; or

(b) An employee is required to place a body part into a point of operation or where an associated danger zone exists during a machine operating cycle.

Exception: Minor servicing activities, that take place during normal production operations, are not covered by this standard if they are routine, repetitive, and integral to the use of the equipment for production, provided that the work is performed using alternative measures that provide effective protection.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-32001, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-32003 When does this section not apply? (1) WAC 296-306A-320 does not apply to work on cord and plug connected electric equipment when:

(a) Unexpected energization or start up of the equipment is controlled by unplugging the equipment from the energy source; and

(b) The plug is under the exclusive control of the employee performing the servicing or maintenance.

(2) WAC 296-306A-320 does not apply to hot tap operations involving transmission and distribution systems for substances such as gas, steam, water, or petroleum products when they are performed on pressurized pipelines, when:

(a) Continuity of service is essential;

(b) Shutdown of the system is impractical; and

(c) Documented procedures are followed, and special equipment is used that will provide proven effective protection for employees.

(3) WAC 296-306A-320 does not cover exposure to electrical hazards from work on, near, or with conductors or equipment in electric utilization installations. These hazards are covered in chapter 296-306A WAC Part T.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-32003, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-32005 What definitions apply to this section? "Affected employee" means an employee who uses a machine or equipment while it is serviced or maintained under lockout or tagout, or who works where such servicing or maintenance is being performed.

"Authorized employee" means a person who locks out or tags out machines or equipment in order to perform servicing or maintenance on that machine or equipment. An affected employee becomes an authorized employee when that employee's duties include performing servicing or maintenance covered under this part.

"Capable of being locked out" means an energy isolating device that has a hasp or other means for a lock to be affixed, or has a locking mechanism built into it. It also means that the device can be locked out without dismantling, rebuilding, or replacing the energy isolating device or permanently altering its energy control capability.

"Energized" means connected to an energy source or containing residual or stored energy.

"Energy isolating device" means a mechanical device that physically prevents the transmission or release of energy, including but not limited to the following:

- A manually operated electrical circuit breaker;
- A disconnect switch;
- A manually operated switch with conductors of circuit that can be disconnected from all ungrounded supply conductors and allows no pole to operate independently;
- A line valve;
- A block; and
- Any similar device used to block or isolate energy.

Push buttons, selector switches, and other control circuit devices are not energy isolating devices.

"Energy source" means any source of electrical, mechanical, hydraulic, pneumatic, chemical, thermal, or other energy, including gravity.

"Hot tap" means a procedure used in repair, maintenance, and service activities that involves welding on a piece of equipment (pipelines, vessels, or tanks) under pressure, in order to install connections or accessories. It is commonly used to replace or add sections of pipeline without the interruption of service for air, gas, water, steam, and petrochemical distribution systems.

"Lockout" means placing a lockout device on an energy isolating device, in accordance with an established procedure, to ensure that the energy isolating device and the equipment being controlled cannot be operated until the lockout device is removed.

"Lockout device" means a device with a positive means such as a lock (key or combination type) to hold an energy isolating device in the safe position and prevents the energizing of a machine or equipment. Blank flanges and bolted slip blinds are included.

"Normal production operations" means using a machine or equipment for its intended production function.

"Servicing and/or maintenance" means workplace activities such as constructing, installing, setting up, adjusting, inspecting, modifying, and maintaining and/or servicing machines or equipment. These activities include lubrication, cleaning, or unjamming of machines or equipment and making adjustments or tool changes, where the employee may be exposed to the unexpected energization or start up of the equipment or release of hazardous energy.

"Setting up" means any work performed to prepare a machine or equipment to perform its normal production operation.

"Tagout" means placing a tagout device on an energy isolating device, according to an established procedure, to indicate that the energy isolating device and the equipment being controlled must not be operated until the tagout device is removed.

"Tagout device" means a prominent warning device, such as a tag and attachment, that can be securely fastened to an energy isolating device according to an established procedure, to indicate that the energy isolating device and the equipment being controlled must not be operated until the tagout device is removed.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-32005, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-32007 What are the required elements of an energy control program? You must establish a written energy control program consisting of:

- An energy control procedure;
- Employee training; and
- Periodic inspections.

The purpose of the program is to ensure that before any employee services or maintains a machine or equipment where the unexpected energizing, start up, or release of stored energy could occur and cause injury, the machine or equipment is isolated from the energy source, and rendered inoperative.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-32007, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-32009 How does an employer determine when to use lockout vs. tagout? (1) If an energy isolating device is not capable of being locked out, your energy control program must use a tagout system.

(2) If an energy isolating device is capable of being locked out, your energy control program must use lockout unless a tagout system will provide full employee protection according to WAC 296-306A-32011.

(3) Whenever major replacement or major repair, renovation, or modification of a machine or equipment is performed, and whenever new machines or equipment are installed, energy isolating devices for such machines or equipment must be designed to accept a lockout device.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-32009, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-32011 What requirements must be met to substitute tagout for lockout? (1) You must ensure that when a tagout device is used on an energy isolating device that is capable of being locked out, the tagout device is attached at the same location that the lockout device would have been attached. You must also ensure that the tagout program will provide safety that is equivalent to a lockout program.

(2) To demonstrate that a tagout program provides safety that is equivalent to a lockout program, you must demonstrate full compliance with all tagout requirements and any other measures necessary to provide equivalent safety. Other measures include:

- (a) Implementing additional safety measures such as the removal of an isolating circuit element;
- (b) Blocking a controlling switch;
- (c) Opening an extra disconnecting device; or
- (d) Removing a valve handle to reduce the likelihood of inadvertent energization.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-32011, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-32013 What are the required elements of energy control procedures? (1) You must develop, document, and use procedures to control potentially hazardous energy when employees are engaged in activities covered by this section.

Exception: You are exempt from documenting procedures for a particular machine or equipment only when all of the following elements exist:

- (a) The machine or equipment has no potential for stored or residual energy or reaccumulation of stored energy after shut down that could endanger employees;
- (b) The machine or equipment has a single energy source that can be readily identified and isolated;
- (c) The isolation and locking out of that energy source will completely deenergize and deactivate the machine or equipment;
- (d) The machine or equipment is isolated from that energy source and locked out during servicing or maintenance;
- (e) A single lockout device will achieve lockout;
- (f) The lockout device is under the exclusive control of the authorized employee performing the servicing or maintenance;
- (g) The servicing or maintenance does not create hazards for other employees; and
- (h) The worksite has experienced no accidents involving the unexpected activation or reenergization of the machine or equipment during servicing or maintenance.

(2) The procedures must clearly and specifically outline the scope, purpose, authorization, rules, and techniques for the control of hazardous energy, and the means to enforce compliance including, but not limited to, the following:

(a) A specific statement of the intended use of the procedure;

(b) Specific procedural steps for shutting down, isolating, blocking, and securing machines or equipment to control hazardous energy;

(c) Specific procedural steps for the placement, removal, and transfer of lockout devices or tagout devices and the responsibility for them; and

(d) Specific requirements for testing a machine or equipment to determine and verify the effectiveness of lockout devices, tagout devices, and other energy control measures.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-32013, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-32015 What requirements apply to lockout and tagout devices and materials? (1) You must provide locks, tags, chains, wedges, key blocks, adapter pins, self-locking fasteners, or other hardware for isolating, securing, or blocking machines or equipment from energy sources.

(2) Lockout and tagout devices must be singularly identified; must be the only device(s) used for controlling energy; must not be used for other purposes.

(3) Lockout and tagout devices must be durable and meet the following requirements:

(a) Lockout and tagout devices must be able to withstand the environment to which they are exposed for the maximum period of time that exposure is expected.

(b) Tagout devices must be constructed and printed so that exposure to weather conditions or wet and damp locations will not deteriorate the tag or make the tag's message illegible.

(c) Tags must not deteriorate when used in corrosive environments such as areas where acid and alkali chemicals are handled and stored.

(4) Lockout and tagout devices must be the same within the facility in at least color, shape, or size. Also, tagout devices must have the same print and format.

(5) Lockout and tagout devices must be substantial and meet the following requirements:

(a) Lockout devices must be substantial enough to prevent removal without the use of excessive force or unusual techniques, such as with the use of bolt cutters or other metal cutting tools.

(b) Tagout devices and their means of attachment must be substantial enough to prevent accidental removal. Tagout device attachment means must be single-use, attachable by hand, self-locking, releasable with an unlocking strength of at least 50 pounds, and having the general design and basic characteristics of being at least equivalent to a one-piece, all-environment-tolerant nylon cable tie.

(c) Lockout and tagout devices must indicate the name of employee applying the device(s).

(6) Tagout devices must warn against hazardous conditions if the machine or equipment is energized and

must include a message such as: "Do not start," "do not open," "do not close," "do not energize," "do not operate."

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-32015, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-32017 How often must the energy control procedure be inspected? (1) You must conduct an inspection of the energy control procedure at least annually to ensure that the procedure and the requirements of this standard are followed.

(a) An authorized employee, other than the one(s) using the energy control procedure, must perform the inspection.

(b) The inspection must be conducted to correct any deviations or inadequacies identified.

(c) Where lockout is used for energy control, the inspection must include a review, between the inspector and each authorized employee, of that employee's responsibilities under the energy control procedure.

(d) Where tagout is used for energy control, the inspection must include a review, between the inspector and each authorized and affected employee, of that employee's responsibilities under the energy control procedure, and the elements of WAC 296-306A-32021.

(2) You must certify that the inspections have been performed. The certification must identify the machine or equipment on which the energy control procedure was being used, the date of the inspection, the employees included in the inspection, and the person performing the inspection.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-32017, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-32019 What general requirements apply to energy control program training and communication? You must provide training to ensure that employees understand the purpose and function of the energy control program, and that employees have the knowledge and skills required for the safe application, use, and removal of the energy controls. The training must include the following:

(1) Each authorized employee must receive training in the recognition of applicable hazardous energy sources, the type and magnitude of the energy available in the workplace, and the methods and means necessary for energy isolation and control.

(2) Each affected employee must be instructed in the purpose and use of the energy control procedure.

(3) All other employees who work in an area where energy control procedures must be used, must be instructed about the procedure and the prohibition against attempting to restart or reenergize machines or equipment that are locked out or tagged out.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-32019, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-32021 What additional requirements apply to tagout training and communication? When tagout systems are used, employees must also be trained in the following limitations of tags:

(1) Tags are warning devices affixed to energy isolating devices, and do not provide the physical restraint on those devices that is provided by a lock.

(2) When a tag is attached to an energy isolating means, it is not to be removed without approval of the authorized person responsible for it, and it is never to be bypassed, ignored, or otherwise defeated.

(3) Tags must be legible and understandable by all authorized, affected, and other employees working in the area.

(4) Tags and their means of attachment must be made of materials that will withstand the environmental conditions encountered in the workplace.

(5) Tags may create a false sense of security, and their meaning needs to be understood as part of the overall energy control program.

(6) Tags must be securely attached to energy isolating devices so that they cannot be accidentally detached during use.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-32021, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-32023 What requirements apply to employee retraining? (1) Authorized and affected employees must be retrained whenever there is a change in job assignments, machines, equipment, or processes that present a new hazard, or when there is a change in the energy control procedures.

(2) Additional retraining must also be provided whenever an inspection reveals, or whenever you believe, that the employee's knowledge or use of the energy control procedures is inadequate.

(3) Retraining must reestablish employee proficiency and introduce new or revised control methods and procedures, as necessary.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-32023, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-32025 What training records must an employer keep? You must keep records that certify that employee training has been completed and is up to date. The records must contain each employee's name and dates of training.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-32025, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-32027 Who may perform lockout or tagout? Lockout or tagout must be performed only by authorized employees performing the service or maintenance.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-32027, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-32029 Who must be notified of lockout and tagout? Affected employees must be notified of the application and removal of lockout or tagout devices. Notification must be given before controls are applied and after they are removed.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-32029, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-32031 What order of events must lockout or tagout procedures follow? The established

lockout or tagout procedures must cover the following elements in the following sequence:

Machinery or equipment shutdown before lockout or tagout:

(1) Before an authorized or affected employee turns off a machine or equipment, the authorized employee must have knowledge of the type and magnitude of the energy, the hazards of the energy to be controlled, and the method or means to control the energy.

(2) The machine or equipment must be turned off or shut down using the procedures established for the machine or equipment. The shutdown must be done in the prescribed order to avoid increased hazards to employees.

(3) All necessary energy isolating devices must be physically located and operated in such a manner as to isolate the machine or equipment from the energy source.

Application of the lockout or tagout device:

(4) Lockout or tagout devices must be affixed to each energy isolating device by authorized employees.

(5) Lockout devices, where used, must be affixed in a manner that will hold the energy isolating devices in a "safe" or "off" position.

(6) Tagout devices, where used, must be affixed in such a manner as will clearly indicate that the operation or movement of energy isolating devices from the "safe" or "off" position is prohibited.

(a) Where tagout devices are used with energy isolating devices designed with the capability of being locked, the tag attachment must be fastened at the same point at which the lock would have been attached.

(b) Where a tag cannot be affixed directly to the energy isolating device, the tag must be located as close as safely possible to the device, in a position that will be immediately obvious to anyone attempting to operate the device.

Eliminating the hazards of stored energy:

(7) After applying lockout or tagout devices to energy isolating devices, all potentially hazardous stored or residual energy must be relieved, disconnected, restrained, and otherwise rendered safe.

(8) If there is a possibility of reaccumulation of stored energy to a hazardous level, verification of isolation must be continued until the servicing or maintenance is completed, or until the possibility of such accumulation no longer exists.

Before beginning service or maintenance:

(9) Prior to starting work on machines or equipment that have been locked out or tagged out, the authorized employee must verify that the machine or equipment has been isolated and deenergized.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-32031, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-32033 What order of events must be followed to remove lockout or tagout devices? (1) Before removing lockout or tagout devices, the authorized employee must complete the following procedures:

(a) Inspect the work area to ensure that nonessential items have been removed and to ensure that machine or equipment components are operationally intact.

(b) Check the work area to ensure that all employees have been safely positioned or removed.

(2) After lockout or tagout devices have been removed and before a machine or equipment is started, affected

employees must be notified that the lockout or tagout device(s) have been removed.

(3) Each lockout or tagout device must be removed from each energy isolating device by the authorized employee who applied the device.

Exception: When the authorized employee who applied the lockout or tagout device is not available to remove it, that device may be removed under your direction, if specific procedures and training for such removal have been developed, documented, and incorporated into the energy control program.

You must ensure that the specific procedure provides equivalent safety to the removal of the device by the authorized employee who applied it. The specific procedure must include at least the following elements:

(a) Verification by the employer that the authorized employee who applied the device is not at the facility;

(b) Making all reasonable efforts to inform the authorized employee that the lockout or tagout device has been removed; and

(c) Ensuring that the authorized employee has this knowledge before resuming work at that facility.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-32033, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-32035 What requirements apply to testing and positioning machines and equipment? When lockout or tagout devices must be temporarily removed from the energy isolating device and the machine or equipment energized to test or position the machine or equipment, the following sequence of actions must be followed:

(1) Clear the machine or equipment of tools and materials according to WAC 296-306A-32033 (1)(a).

(2) Remove employees from the machine or equipment area according to WAC 296-306A-32033 (1)(b).

(3) Remove the lockout or tagout devices as specified in WAC 296-306A-32033(3).

(4) Energize and proceed with testing or positioning.

(5) Deenergize all systems and reapply energy control measures in accordance with WAC 296-306A-32031 to continue the servicing and/or maintenance.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-32035, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-32037 What requirements apply to outside servicing contractors? (1) Whenever outside servicing contractors are to be engaged in activities covered by this standard, you and the outside employer must inform each other of your respective lockout or tagout procedures.

(2) The outside employer must ensure that employees understand and comply with the restrictions and prohibitions of your energy control program.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-32037, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-32039 What requirements apply to group lockout or tagout? (1) When servicing and/or maintenance is performed by a crew or other group, they must use a procedure that provides a level of protection equivalent to that provided by the implementation of a personal lockout or tagout device.

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(2) Group lockout or tagout devices must be used according to the procedures required by WAC 296-306A-32013 including, but not limited to, the following:

(a) An authorized employee has primary responsibility for a set number of employees working under the protection of a group lockout or tagout device (such as an operations lock); and

(b) A method for the authorized employee to determine if individual group members are exposed to release of stored energy hazards; and

(c) When more than one crew or group is involved, assignment of overall lockout or tagout control responsibility to an authorized employee designated to coordinate individual group members and ensure continuity of protection; and

(d) Each authorized employee must affix a personal lockout or tagout device to the group lockout device when beginning work, and must remove those devices when the work is complete.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-32039, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-32041 What requirements apply to lockout/tagout during shift changes? During shift or personnel changes, you must ensure that employees follow specific procedures to ensure the continuity of lockout or tagout protection. The procedures must include orderly transfer of lockout or tagout protection between off-going and oncoming employees, to minimize exposure to hazards from the unexpected energization or start-up of the machine or equipment, or release of stored energy.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-32041, filed 10/31/96, effective 12/1/96.]

Part R

Safety Color Coding; Accident Prevention Signs and Tags

WAC 296-306A-330 Safety color coding; accident prevention signs and tags.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-330, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-33001 What definitions apply to this section? "Accident prevention sign" ("sign") means a surface with text or pictographs, meant to warn or instruct employees who may be exposed to hazards. Safety posters and education bulletins are not included in this definition.

"Accident prevention tag" ("tag") means a card that identifies a hazardous condition, generally related to unsafe equipment.

"Major message" means the sign's or tag's text that is more specific than the signal word and that identifies the specific hazardous condition or safety instruction. Examples include: "High Voltage," "Close Clearance," "Do Not Start," or "Do Not Use" or a corresponding pictograph.

"Pictograph" means a pictorial representation that identifies a specific hazardous condition or safety instruction.

"Signal word" means the sign's or tag's text that contains the word, usually "danger" or "caution" that is intended to capture the employee's immediate attention.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-33001, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-33003 What does red identify in safety color coding? Use red to identify:

- (1) Fire protection equipment;
 - (2) Safety cans or other portable containers of flammable liquids;
 - (3) Danger signs and tags;
 - (4) Emergency stop bars on hazardous machines; and
 - (5) Stop buttons or electrical switches used to stop machinery in an emergency;
- Red lights must be provided at barricades and at temporary obstructions, as specified in ANSI Safety Code for Building Construction, A10.2-1944.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-33003, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-33005 What does yellow identify in safety color coding? Use yellow to identify:

- (1) Caution signs and tags; and
- (2) Physical hazards.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-33005, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-33007 When should signs and tags use "danger" versus "caution"? (1) Danger signs and tags.

(a) Use danger signs and tags when an immediate hazard presents a threat of death or serious injury to employees.

(b) Instruct all employees that danger signs and tags indicate immediate danger and that special precautions are necessary.

(2) Caution signs and tags.

(a) Use caution signs and tags to warn against potential hazards or to caution against unsafe practices.

(b) Instruct all employees that caution signs and tags indicate a possible hazard against which proper precaution should be taken.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-33007, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-33009 What are the design and color specifications for accident prevention signs? (1) All signs must have rounded or blunt corners and be free from sharp edges. The ends or heads of bolts or other fastening devices must be located so that they do not constitute a hazard.

(2) Danger, caution, directional, informational, exit, and safety instruction signs must comply with the specification of safety colors of the ANSI Z53.1-1971.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-33009, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-33011 What are the proper uses of accident prevention tags? (1) Use tags as a temporary

means of warning employees of a hazardous condition, especially defective equipment. Tags are not a complete warning method, but should be used until the hazard can be eliminated.

For example: You may use a "do not start" tag on power equipment for a short time until the switch in the system can be locked out; you may use a "defective equipment" tag on a damaged ladder while arrangements are made for the ladder to be taken out of service and repaired.

(2) Use of accident prevention tags.

(a) Use tags as a warning to prevent accidental injury or illness to employees who are exposed to hazardous or potentially hazardous conditions, equipment or operations that are out of the ordinary, unexpected or not readily apparent.

(b) Use tags until the identified hazard is eliminated or the hazardous operation is completed. Tags are not necessary if signs, guarding, or other protection is used.

(c) Place "do not start" tags in a conspicuous location and, if possible, so that they block the starting mechanism that would cause hazardous conditions if the equipment was energized.

(3) General accident prevention tag specifications.

(a) Tags must contain a signal word and a major message. The signal word must be either "danger" or "caution."

(b) The signal word must be readable at least five feet from the hazard.

(c) The signal word and the major message must be understandable to all employees who may be exposed to the identified hazard.

(d) Inform all employees of the meaning of the tags used throughout the workplace and what special precautions are necessary.

(e) Attach tags as closely as is safely possible to the hazard. Attach the tags so as to prevent loss or unintentional removal.

(f) The tag and attachment method must be constructed of material that is not likely to deteriorate.

(4) You may use warning tags to represent a hazard level between "caution" and "danger," instead of the required "caution" tag, if they have a signal word of "warning" and an appropriate major message.

(5) Use "out of order" tags only to indicate that a piece of equipment, machinery, etc., is out of order and that it might present a hazard if used.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-33011, filed 10/31/96, effective 12/1/96.]

Part S

Fire Protection and Ignition Sources; Exit Routes

WAC 296-306A-340 Portable fire extinguishers.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-340, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-34003 What does this section cover? (1) WAC 296-306A-340 applies to the placement, use, maintenance, and testing of portable fire extinguishers provided for employee use. WAC 296-306A-34012 does not

apply to extinguishers provided for employee use on the outside of workplace buildings or structures. If you do not intend for employees to use extinguishers, and your emergency action plan and fire prevention plan meet the requirements of WAC 296-306A-35018, then only the requirements of WAC 296-306A-34015 and 296-306A-34018 apply.

(2) All standpipe and hose systems, automatic sprinkler systems, fixed extinguishing systems, dry-chemical fixed extinguishing systems, water-spray and foam, and fire detection systems, must be installed according to state and local ordinances, codes, and regulations governing such installations.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-34003, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-34006 Who is exempt from the requirements of this section? (1) You are exempt from all requirements of this section, if:

(a) You have implemented a written fire safety policy that requires all employees to evacuate immediately when the fire alarm sounds; and

(b) You have an emergency action plan and a fire prevention plan meeting the requirements of WAC 296-306A-35015 and 296-306A-35018; and

(c) Extinguishers are not available for employee use in the workplace.

Note: If a specific section of this chapter requires you to provide a portable fire extinguisher, this exemption does not apply.

(2) You are exempt from the distribution requirements in WAC 296-306A-34012, if:

(a) You have an emergency action plan meeting the requirements of WAC 296-306A-35015 that authorizes only certain employees to use the available portable fire extinguishers; and

(b) The plan requires all other employees to evacuate immediately when the fire alarm sounds.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-34006, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-34009 What general requirements apply to portable fire extinguishers? (1) You must provide portable fire extinguishers that are readily accessible to employees without subjecting the employees to possible injury.

(2) You must only use approved portable fire extinguishers.

(3) Portable fire extinguishers using carbon tetrachloride or chlorobromomethane extinguishing agents are prohibited.

(4) Water type fire extinguishers with a soldered or riveted shell that use self-generating soda acid or self-generating foam or gas cartridges are prohibited.

(5) You must ensure that all portable fire extinguishers are fully charged, operable, and kept in their designated places at all times except during use.

(6) You must ensure that all portable fire extinguishers are tested, constructed, and used according to the National Fire Protection Association's pamphlet No. 10A-1970.

Note: The supplier of the extinguisher or local fire official can furnish this information.

(7) You must post "no smoking" signs in areas where fire or explosion hazards exist. You must prohibit smoking within fifty feet of all refueling operations. Take precautions to prevent open flames, sparks, or electric arcs in refueling areas.

(8) You must keep a portable fire extinguisher with a rating of at least 12-B units outside the door of any room used to store flammables or combustibles. This extinguisher must not be more than ten feet from the door.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-34009, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-34012 How should portable fire extinguishers be selected and distributed? (1) You must select and distribute portable fire extinguishers based on the classes of anticipated workplace fires and on the size and degree of hazard that would affect their use.

(2) Distribution of portable fire extinguishers.

(a) For Class A fires: You must distribute portable fire extinguishers so that no employee must travel more than 75 feet (22.9 m) to a fire extinguisher.

Exception: You may use uniformly spaced standpipe systems or hose stations connected to a sprinkler system for emergency use by employees instead of Class A portable fire extinguishers, if:

- The system meets all regulatory requirements governing total coverage of the area to be protected; and
- Employees are trained at least annually in their use.

(b) For Class B fires: You must distribute portable fire extinguishers so that no employee must travel more than 50 feet (15.2 m) to a fire extinguisher.

(c) For Class C fires: You must distribute portable fire extinguishers on the basis of the appropriate pattern for the existing Class A or Class B hazards.

(d) For Class D fires: You must distribute portable fire extinguishers or other containers of Class D extinguishing agent so no employee must travel more than 75 feet (22.9 m) from the combustible metal working area to any extinguishing agent. Portable fire extinguishers for Class D hazards are required in those combustible metal working areas where combustible metal powders, flakes, shavings, or similarly sized products are generated at least once every two weeks.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-34012, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-34015 What are the requirements for inspection, maintenance and testing of portable fire extinguishers? (1) You are responsible for the inspection, maintenance, and testing of all portable fire extinguishers in the workplace.

(2) You must visually inspect portable extinguishers or hose at least once a month.

(3) You must ensure that portable fire extinguishers receive an annual maintenance check. You must keep records of the maintenance dates for one year after the previous entry or the life of the shell, whichever comes first. You must provide us with a copy of the record if we ask for it.

(4) You must ensure that stored-pressure dry chemical extinguishers that require a twelve-year hydrostatic test are

emptied and undergo applicable maintenance procedures every six years.

Exception: Dry chemical extinguishers with nonrefillable disposable containers are exempt from this requirement.

The six years begins when recharging or hydrostatic testing is performed.

(5) You must ensure that alternate equivalent protection is provided when portable fire extinguishers are removed from service for maintenance and recharging.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-34015, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-34018 What requirements apply to hydrostatic testing? (1) You must ensure that a trained person performs hydrostatic testing with suitable testing equipment and facilities.

(2) You must ensure that portable extinguishers are hydrostatically tested at the intervals listed in the table below.

Type of Extinguishers	Test interval (years)
Soda acid (stainless steel shell)	5
Cartridge operated water and/or antifreeze	5
Stored pressure water and/or antifreeze	5
Wetting agent	5
Foam (stainless steel shell)	5
Aqueous film forming form (AFFF)	5
Loaded stream	5
Dry chemical with stainless steel	5
Carbon dioxide	5
Dry chemical, stored pressure, with mild steel, brazed brass or aluminum shells	12
Dry chemical, cartridge or cylinder operated, with mild steel shells	12
Halon 1211	12
Halon 1301	12
Dry powder, cartridge or cylinder operated, with mild steel shell	12

Exception: Extinguishers must not be hydrostatically tested if the following conditions exist:

- (a) When the unit has been repaired by soldering, welding, brazing, or use of patching compounds;
- (b) When the cylinder or shell threads are damaged;
- (c) When there is corrosion that has caused pitting, including corrosion under removable name plate assemblies;
- (d) When the extinguisher has been burned in a fire; or
- (e) When a calcium chloride extinguishing agent has been used in a stainless steel shell.

(3) In addition to an external visual examination, you must ensure that the cylinders and shells are examined internally before the hydrostatic testing.

(4) You must ensure that portable fire extinguishers are hydrostatically tested whenever they show new evidence of corrosion or mechanical injury.

(5) You must ensure that hydrostatic tests are performed on extinguisher hose assemblies that are equipped with a shut-off nozzle at the discharge end of the hose. The test interval must be the same as specified for the extinguisher on which the hose is installed.

(6) Carbon dioxide hose assemblies with a shut-off nozzle must be hydrostatically tested at 1,250 psi (8,620 kPa).

(7) Dry chemical and dry powder hose assemblies with a shut-off nozzle must be hydrostatically tested at 300 psi (2,070 kPa).

(8) Hose assemblies passing a hydrostatic test do not require any type of recording or stamping.

(9) You must ensure that hose assemblies for carbon dioxide extinguishers that require a hydrostatic test are tested within a protective cage device.

(10) You must ensure that carbon dioxide extinguishers and nitrogen or carbon dioxide cylinders used with wheeled extinguishers are tested every five years at 5/3 of the service pressure as stamped into the cylinder. Nitrogen cylinders that comply with 29 CFR 173.34 (e)(15) may be hydrostatically tested every ten years.

(11) You must ensure that all stored pressure and Halon 1211 types of extinguishers are hydrostatically tested at the factory test pressure not to exceed two times the service pressure.

(12) You must ensure that self-generating type soda acid and foam extinguishers are tested at 350 psi (2,410 kPa).

(13) Air or gas pressure used for hydrostatic testing is prohibited.

(14) You must remove from the workplace all extinguisher shells, cylinders, or cartridges that fail a hydrostatic pressure test, or that are not fit for testing.

(15)(a) Water-jacket equipment must be used for testing compressed gas type cylinders. The equipment must have an expansion indicator that operates with an accuracy within one percent of the total expansion or 0.1 cc (.1 mL) of liquid.

(b) The following equipment must be used to test noncompressed gas type cylinders:

(i) A hydrostatic test pump, hand or power operated, capable of producing not less than one hundred fifty percent of the test pressure, which must include appropriate check valves and fittings;

(ii) A flexible connection for attachment to fittings to test through the extinguisher nozzle, test bonnet, or hose outlet, as is applicable; and

(iii) A protective cage or barrier for personal protection of the tester, designed to provide visual observation of the extinguisher under test.

(16) You must maintain records of the hydrostatic testing. Your records must include:

- The date of test;
- The test pressure used;
- The serial number, or other identifier of the fire extinguisher that was tested; and
- The person or agency performing the test.

You must keep the records until the next testing, or until the extinguisher is taken out of service, whichever comes first. You must provide us with copies of the records if we ask for them.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-34018, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-34021 What are the training requirements for portable fire extinguishers? (1) If you

provide portable fire extinguishers for employee use, then you must also provide training to familiarize employees with the general principles of fire extinguisher use and the hazards involved in fighting fires when they first appear.

You must provide the training when the employee is first hired and at least annually thereafter.

(2) For employees who have been designated to use fire fighting equipment as part of an emergency action plan, you must provide training in the use of the appropriate equipment.

You must provide the training upon initial assignment to the designated group of employees and at least annually thereafter.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-34021, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-345 Employee alarm systems.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-345, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-34503 What does this section cover? (1) WAC 296-306A-345 applies to all emergency employee alarms required by a specific WAC chapter. This section does not apply to discharge or supervisory alarms required on various fixed extinguishing systems or to supervisory alarms on fire suppression, alarm or detection systems unless they are intended to be employee alarm systems.

(2) The maintenance, testing, and inspection requirements of this section apply to all local fire alarm signaling systems used for alerting employees regardless of the other functions of the system.

(3) All predischarge employee alarms required by this chapter must meet the requirements of WAC 296-306A-34506 and 296-306A-34512.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-34503, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-34506 What general requirements apply to employee alarm systems? (1) Your employee alarm system must provide warning for necessary emergency action called for in the emergency action plan, or safe escape of employees from the workplace.

(2) You must ensure that all employees can see or hear your employee alarm above normal noise or light levels in the workplace. You may use tactile devices to alert employees who can not see or hear the alarm.

(3) You must ensure that your employee alarm is recognizable as an evacuation signal or signal to perform actions designated under the emergency action plan.

(4) You must explain to each employee how to report emergencies. For example: They may use manual pull box alarms, public address systems, radio or telephones. You must post emergency telephone numbers near telephones, or employee notice boards when telephones serve as a means of reporting emergencies. When your communication system also serves as the employee alarm system, you must ensure that all emergency messages have priority over all nonemergency messages.

(5) You must establish procedures for sounding emergency alarms in the workplace. If you have ten or fewer employees in a workplace, direct voice communication is an acceptable procedure for sounding the alarm if all employees can hear it. In this case, you do not need a back-up system.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-34506, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-34509 What are the installation and restoration requirements for employee alarm systems? (1) You must ensure that all systems installed to comply with this standard are approved. Steam whistles, air horns, strobe lights or similar lighting devices, or tactile devices meeting the requirements of this section must also be approved.

(2) After each test or alarm, you must ensure that all employee alarm systems are restored to normal operating condition as soon as possible. You must ensure that you have spare alarm components available in sufficient quantities and locations for prompt restoration of the system.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-34509, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-34512 How must employee alarm systems be maintained and tested? (1) You must ensure that all employee alarm systems are maintained in operating condition except when undergoing repairs or maintenance.

(2) You must ensure that a test of the reliability and adequacy of nonsupervised employee alarm systems is made every two months. You must use a different actuation device in each test of a multiactuation device system so that no individual device is used for two consecutive tests.

(3) You must maintain or replace power supplies as often as necessary to ensure fully operational condition. You must provide back-up alarms, such as employee runners or telephones, when systems are out of service.

(4) You must ensure that supervised employee alarm circuitry is supervised and that it will provide positive notification to assigned personnel whenever a deficiency exists in the system. You must ensure that all supervised employee alarm systems are tested at least annually for reliability and adequacy.

(5) You must ensure that employee alarms are serviced, maintained, and tested by someone trained in the operation and functions necessary for reliable and safe operation of the system.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-34512, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-34515 Where must manually operated devices be located? You must ensure that manually operated actuation devices used with employee alarms are easy to find and accessible.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-34515, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-350 Exit routes.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-350, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-35003 What does this section cover? WAC 296-306A-350 requires you to provide exit routes for employees to leave the workplace safely during emergencies. This section does not apply to mobile workplaces, such as vehicles or vessels.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-35003, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-35006 What definitions apply to this section? "Exit" means the portion of an exit route that is generally separated from other areas to provide a protected way of travel out of the workplace.

"Exit route" means a continuous and unobstructed path of exit travel from any point within a workplace to safety outside. An exit route generally consists of three parts: Access to an exit; the area which provides a way of travel out of the workplace; and the way from the exit to the outside. An exit route includes all vertical and horizontal areas.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-35006, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-35009 What are the design requirements for exit routes? You must ensure that each workplace meets each of the following requirements:

- (1) Each exit is a permanent part of the workplace.
- (2) Two exit routes, remote from one another, are available to provide alternate means for employees to safely leave the workplace during an emergency.
 - (a) A single exit route is permitted where the number of employees, the size of the building, its occupancy, or the arrangement of the workplace indicate that a single exit will allow all employees to exit safely during an emergency. Other means of escape, such as fire exits or accessible windows, should be available where fewer than two exit routes are provided.
 - (b) More than two exit routes are available to allow employees to safely leave the workplace during an emergency where the number of employees, the size of the building, its occupancy, or the arrangement of the workplace reasonably suggest that reliance on two exit routes could endanger employees.
- (3) An exit has only those openings necessary to permit access to, or exit from, occupied areas of the workplace. An opening into an exit is protected by a self-closing fire door that remains closed. Each fire door, its frame, and hardware are listed or approved by a nationally recognized testing laboratory.
- (4) Construction materials used to separate an exit have a 1-hour fire resistance rating if the exit connects three or fewer stories. Construction materials used to separate an exit have a 2-hour fire resistance rating if the exit connects 4 or more stories.
- (5) Free and unobstructed access to each exit route is provided to ensure safe exit during an emergency.
 - (a) The exit route is free of material or equipment.
 - (b) Employees are not required to travel through a room that can be locked, such as a bathroom, or toward a dead end to reach an exit.
 - (c) Stairs or a ramp are used if the exit route is not substantially level.

(6) An exit leads directly outside or to a street, walkway, refuge area, or to an open space with access to the outside.

(a) The street, walkway, refuge area, or open space to which an exit leads is large enough to accommodate all building occupants likely to use that exit.

(b) A refuge area is:

(i) A space along an exit route protected from the effects of fire either by separation from other spaces within the building or by its location; or

(ii) A floor with at least two spaces separated by smoke-resistant partitions, in a building where each floor is protected by an automatic sprinkler system. An automatic sprinkler system complies with NFPA No. 13, Automatic Sprinkler Systems.

(c) Exit stairs that continue beyond the floor of exit discharge are interrupted by doors, partitions, or other effective means.

(7) Where a doorway or corner of a building is located near a railroad or trolley track so that an employee is liable to walk upon the track in front of an approaching engine or cars, a standard safeguard must be installed with a warning sign.

(8) An exit door can be readily opened from the inside without keys, tools, or special knowledge. A device, such as a panic bar, that locks only from the outside is permitted. An exit door is free of any device or alarm that, if it fails, can restrict emergency use of an exit.

Note: An exit door may be locked or blocked from the inside in a mental, penal, or correctional institution, if supervisory personnel are continually on duty and a plan exists to remove occupants during an emergency.

(9) The opening device on all doors of walk-in refrigerated or freezer rooms must be the type, when locked from the outside with a lock, can be opened from inside.

(10) A side-hinged exit door is used to connect any room to an exit route. A door that connects any room to an exit route swings out if the room may be occupied by more than 50 persons or highly flammable or explosive materials may be used inside.

(11) Each exit route supports the maximum-permitted occupant load for each floor served by the exit route. The capacity of an exit does not decrease with the direction of exit travel.

(12) Minimum height and width requirements:

(a) The ceiling for an exit route is at least 7 feet 6 inches high and the exit route is at least 6 feet 8 inches high at all points.

(b) The width of an exit route is at least 28 inches wide at all points between handrails. An exit route is wider than 28 inches if necessary to accommodate the expected occupant load.

(c) Objects that project into the exit route do not reduce the minimum height and width of an exit route.

(13) An outdoor exit route is permitted if it meets the requirements for an indoor exit route and the following additional requirements.

(a) The exit has guardrails to protect exposed sides.

(b) The exit route is covered if accumulation of snow or ice is likely and is not removed regularly.

(c) The exit route is reasonably straight with smooth, solid, substantially level floors.

(d) The exit route has no dead ends longer than 20 feet.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-35009, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-35012 What are the operation and maintenance requirements for exit routes? You must ensure that each workplace meets the following requirements:

(1) The workplace exit route is maintained to minimize danger to employees during an emergency.

(a) The workplace exit route is free of explosive or highly flammable furnishings or decorations.

(b) Accumulations of flammable or combustible waste materials are controlled.

(c) An exit route does not require employees to travel toward materials that burn very quickly, emit poisonous fumes, or are explosive, unless those materials are effectively shielded from the exit route.

(2) Each exit route is adequately lit.

(3) Each exit is clearly visible and is marked by a distinctive sign reading "exit."

(a) An exit door is free of signs or decorations that obscure its visibility.

(b) Signs are posted along the exit route indicating the direction of travel to the nearest exit.

(c) The line-of-sight to an exit sign is uninterrupted.

(d) Any doorway or passage that might be mistaken for an exit is marked "not an exit" or with an indication of its actual use.

(e) An exit sign is illuminated to a surface value of at least 5 foot candles by a reliable light source and shows a designated color. Self-luminous or electroluminescent signs have a minimum luminance surface value of .06 foot-lamberts.

(4) Fire retardant paints or other coatings used in the workplace are maintained.

(5) Each safeguard to protect employees during an emergency is maintained in proper working order.

(6) Employees do not occupy a workplace under construction until an exit route that meets these requirements is available for the portion of the workplace to be occupied.

(a) Employees do not occupy a workplace during repair or alteration unless either all exits and existing fire protection are maintained or alternate fire protection is provided that ensures an equivalent level of safety.

(b) Flammable or explosive materials used during construction or repair do not expose employees to hazards not otherwise present in the workplace or impede emergency escape from the workplace.

(7) An operable employee alarm system with a distinctive signal to warn employees of fire or other emergencies is installed and maintained. No employee alarm system is required if employees can see or smell a fire or other hazard so that it would provide adequate warning to them. The employee alarm system complies with the requirements of WAC 296-306A-345.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-35012, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-35015 What are the requirements for an emergency action plan? (1) You must develop an emergency action plan for each part of the workplace whenever a WISHA standard requires one.

(a) The plan must be in writing, kept in the workplace, and made available to employees on request.

(b) An employer of 10 or fewer employees may communicate the plan orally to employees rather than develop a written plan.

(2) An emergency action plan must include:

(a) Procedures for emergency evacuation, including exit route assignments;

(b) Procedures to account for all employees after evacuation;

(c) Procedures for reporting a fire or other emergency;

(d) Procedures to follow for emergency operation or shut down of critical equipment before evacuation;

(e) Procedures to follow for rescue and medical duties;

(f) Procedures for operating and maintaining an emergency alarm system; and

(g) Names or job titles of employees to be contacted to get more information about what to do in an emergency.

(3) You must designate employees to assist in the safe emergency evacuation of other employees. You must ensure that the designated employees receive training in emergency evacuation procedures.

(4) You must review the emergency action plan with each employee covered by the plan:

(a) When the plan is developed or the employee is assigned initially to the job;

(b) When the employee's responsibilities under the plan change; and

(c) When the plan is changed.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-35015, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-35018 What are the requirements for a fire prevention plan? (1) You must develop a fire prevention plan for each part of the workplace whenever another WISHA standard requires one.

(a) The plan must be in writing, kept in the workplace, and made available to employees on request.

(b) An employer of 10 or fewer employees may communicate the plan orally to employees rather than develop a written plan.

(2) A fire prevention plan must include:

(a) A list of all major fire hazards, including proper handling and storage procedures for hazardous materials, potential ignition sources and their control, and the type of fire protection equipment necessary to control each major hazard;

(b) Procedures to control accumulations of flammable and combustible waste materials;

(c) Procedures for regular maintenance of safeguards installed on heat producing equipment to prevent accidental ignition of combustible materials;

(d) Names or job titles of employees responsible for maintaining equipment to prevent or control sources of ignition or fires;

(e) Names or job titles of employees responsible for control of fuel source hazards.

(3) You must:

(a) Inform employees of the fire hazards to which they are exposed; and

(b) Review with each employee those parts of the fire prevention plan necessary for self-protection upon initial assignment to a job.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-35018, filed 10/31/96, effective 12/1/96.]

Part T Electrical

WAC 296-306A-360 Electrical.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-360, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36005 What does this part cover?

(1) Chapter 296-306A WAC Part T covers methods to protect against electrical hazards in agricultural workplaces.

(2) Chapter 296-306A WAC Part T does not cover:

- Installations in watercraft, or automotive vehicles; or
- Electric welding. (See chapter 296-306A WAC Part V.)

(3) Unless otherwise provided in this chapter all electrical work, installation, and wire capacities must be according to the National Electrical Code, NFPA 70-1973; ANSI C1-1971, and all other applicable standards administered by the department of labor and industries.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36005, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36010 What definitions apply to this part? The following definitions apply to this part:

"Acceptable" means an installation or equipment that is acceptable to the department and meets the requirements of this section. An installation or equipment is acceptable if:

(1) It is accepted, certified, listed, labeled, or otherwise determined to be safe by a nationally recognized testing laboratory; or

(2) For installations or equipment that no nationally recognized testing laboratory accepts, certifies, lists, labels, or determines to be safe, it is inspected or tested by another federal agency, or by state, municipal, or other local authority responsible for enforcing occupational safety provisions of the National Electrical Code, and complies with the provisions of the National Electrical Code, and complies with the provisions of the National Electrical Code as applied in this section; or

(3) For custom-made equipment or related installations that are designed, fabricated for, and intended for use by a particular customer, it is determined to be safe for its intended use by its manufacturer on the basis of test data that you keep and make available for our inspection.

"Accepted" means an installation that has been inspected and certified by a nationally recognized testing laboratory to meet specified plans or procedures of applicable codes.

"Bonding jumper" means a reliable conductor that provides the correct electrical conductivity between metal parts that are required to be electrically connected.

"Branch circuits" means the part of a wiring system extending beyond the final overcurrent device protecting the circuit. A device not approved for branch circuit protection, such as thermal cutout or motor overload protective device, is not considered as the overcurrent device protecting the circuit.

"Certified" means equipment that:

- Has been tested and found by a nationally recognized testing laboratory to meet nationally recognized standards, or to be safe for use in a specified manner; or
- Is a kind whose production is periodically inspected by a nationally recognized testing laboratory; and
- Bears a label, tag, or other record of certification.

"Exposed" means a live part that can be accidentally touched or approached nearer than a safe distance. This term applies to parts that are not suitably guarded, isolated, or insulated.

"Fixed equipment" means equipment fastened or connected by permanent wiring methods.

"Ground" means a conducting connection, whether intentional or accidental, between an electrical circuit or equipment and earth, or to some conducting body that serves in place of the earth.

"Grounded" means connected to earth or to some conducting body that serves in place of the earth.

"Isolated" means equipment that is not readily accessible except through special means of access.

"Labeled" means equipment that has an attached label, symbol, or other identifying mark of a nationally recognized testing laboratory that:

- Makes periodic inspections of the production of such equipment; and
- Whose labeling indicates compliance with nationally recognized standards or tests to determine safe use in a specified manner.

"Qualified person" means a person who is familiar with the construction and operation of the equipment and the hazards involved.

Note 1: Whether an employee is considered a "qualified person" depends on various circumstances in the workplace. It is possible and likely for an individual to be considered "qualified" with regard to certain equipment in the workplace, but "unqualified" as to other equipment.

Note 2: An employee undergoing on-the-job training and who, in the course of such training, has demonstrated an ability to perform duties safely at his or her level of training and who is under the direct supervision of a qualified person is considered a qualified person for the performance of those duties.

"Shock hazard" exists at an accessible part in a circuit between the part and ground, or other accessible parts if the potential is more than 42.4 volts peak and the current through a 1,500 ohm load is more than 5 milliamperes.

"Weatherproof" means constructed or protected so that exposure to the weather does not interfere with successful operation. Rainproof, raintight, or watertight equipment may be considered weatherproof where weather conditions other than wetness, such as snow, ice, dust, or temperature extremes, are not a factor.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36010, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-362 General electrical requirements.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-362, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36203 What electrical equipment must be approved? The conductors and equipment required or permitted by this section must be approved.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36203, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36206 How must electrical equipment safety be determined? (1) Electrical equipment must be free from hazards to employees. Safety of equipment must be determined using the following considerations:

(a) Suitability for installation and use according to the requirements of this part. Suitability of equipment for a specific purpose may be shown by listing or labeling for that purpose.

(b) Mechanical strength and durability, including, for parts designed to enclose and protect other equipment, the adequacy of the protection provided.

(c) Electrical insulation.

(d) Heating effects under conditions of use.

(e) Arcing effects.

(f) Classification by type, size, voltage, current capacity, specific use.

(g) Other factors that contribute to the practical safeguarding of employees using or likely to come in contact with the equipment.

(2) Listed or labeled equipment must be used or installed according to any instructions included in the listing or labeling.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36206, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36209 What requirements apply to guarding live parts? (1) Unless otherwise indicated, live parts of electric equipment operating at 50 volts or more must be guarded against accidental contact by an approved cabinet or other form of approved enclosure, or by any of the following:

(a) Location in a room, vault, or similar enclosure that is accessible only to qualified persons.

(b) Suitable permanent substantial partitions or screens arranged so that only qualified persons have access to the area within reach of the live parts. Any openings in such partitions or screens must be small enough and located so that employees are not likely to come into accidental contact with live parts or to bring conducting objects into contact with them.

(c) Location on a suitable balcony, gallery, or platform elevated and accessible only to qualified persons.

(d) Elevation of eight feet or more above the floor or other working surface.

(2) In locations where electric equipment would be exposed to physical damage, enclosures or guards must be arranged and be strong enough to prevent damage.

(3) Entrances to rooms and other guarded locations containing exposed live parts must be marked with conspicuous warning signs forbidding unqualified persons to enter.

(4) Electrical repairs must be made only by qualified persons that you authorize.

(5) Fuse handling equipment, insulated for the circuit voltage, must be used to remove or install fuses when the fuse terminals are energized.

(6) Employees must be prohibited from working closely enough to an electric power circuit to contact it unless the employee is protected against electric shock.

Note: The circuit must be protected by deenergizing the circuit and grounding it, by guarding it, by effective insulation, or other means.

(7) In work areas where the exact location of underground electric power lines is unknown, employees using jack-hammers, bars or other hand tools that may contact a line must have insulated protective gloves.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36209, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36212 What workspace must be provided? (1) When parts are exposed, the minimum clearance for the workspace must be at least six feet six inches high, or at least a radius of three feet wide.

(2) There must be enough clearance to permit at least a 90° opening of all doors or hinged panels.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36212, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36215 What general requirements apply to splices? Conductors must be spliced or joined with splicing devices suitable for the use or by brazing, welding, or soldering with a fusible metal or alloy. Soldered splices must first be spliced or joined so they are mechanically and electrically secure without solder and then soldered. (Rosin-core solder should be used instead of acid core solder when joining electrical conductors.) All splices and joints and the free ends of conductors must be covered with an insulation equivalent to that of the conductors or with an insulating device suitable for the purpose.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36215, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36218 What protection must be provided against combustible materials? Parts of electric equipment that in ordinary operation produce arcs, sparks, flames, or molten metal must be enclosed or separated and isolated from all combustible material.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36218, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36221 How must electrical equipment be marked? All electrical equipment in use must have the manufacturer's name, trademark, or other descriptive marking of the organization responsible for the product on the equipment. Other markings must be provided giving voltage, current, wattage, or other ratings as necessary. The marking must be durable enough to withstand the environment.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36221, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36224 How must disconnecting means be marked? Each disconnecting means required by this part for motors and appliances must be legibly marked to indicate its purpose, unless located and arranged so the purpose is evident. Each service, feeder, and branch circuit, at its disconnecting means or overcurrent device, must be legibly marked to indicate its purpose, unless located and arranged so the purpose is evident. These markings must be durable enough to withstand the environment involved.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36224, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36227 What access and working space must be provided for electrical equipment of 600 volts, nominal, or less? Sufficient access and working space must be provided and maintained about all electric equipment to permit ready and safe operation and maintenance of such equipment.

(1) Unless otherwise indicated, the dimension of the working space in the direction of access to live parts operating at 600 volts or less and likely to require examination, adjustment, servicing, or maintenance while alive must be at least that indicated in the table below. Also, workspace must be at least 30 inches wide in front of the electric equipment. Distances must be measured from the live parts if they are exposed, or from the enclosure front or opening if the live parts are enclosed. Concrete, brick, or tile walls are considered grounded. Working space is not required behind assemblies such as dead-front switchboards or motor control centers where there are no renewable or adjustable parts such as fuses or switches on the back and where all connections are accessible from other directions.

Working Clearances

Nominal voltage to ground	Minimum clear distance for condition (ft)		
	(a)	(b)	(c)
0-150	13	13	3
151-600	13	3-1/2	4

Conditions:

- (a) Exposed live parts on one side and no live or grounded parts on the other side of the working space, or exposed live parts on both sides guarded by suitable wood or other insulating material. Insulated wire or insulated busbars operating at 300 volts or less are not considered live parts.
- (b) Exposed live parts on one side and grounded parts on the other side.
- (c) Exposed live parts on both sides of the workspace (not guarded as in (a)) with the operator between.

(2) Working space required by this part must not be used for storage. When normally enclosed live parts are exposed for inspection or servicing, the working space, if in a passageway or general open space, must be suitably guarded.

(3) At least one entrance of sufficient area must be provided to give access to the working space about electric equipment.

(4) Where there are live parts normally exposed on the front of switchboards or motor control centers, the working space in front of such equipment must be at least 3 feet.

(5) All working spaces around service equipment, switchboards, panelboards, and motor control centers installed indoors must be adequately lit.

(6) The minimum headroom of working spaces about service equipment, switchboards, panelboards, or motor control centers must be 6 feet 3 inches.

"Motor control center" means an assembly of one or more enclosed sections having a common power bus and principally containing motor control units.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36227, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36230 What access and working space must be provided for electrical equipment over 600 volts, nominal?

(1) Conductors and equipment used on circuits exceeding 600 volts, nominal, must meet all requirements of WAC 296-306A-36221 and the additional requirements of this section. This section does not apply to equipment on the supply side of the service conductors.

(2) Electrical installations in a vault, room, closet or area surrounded by a wall, screen, or fence, with access controlled by lock and key or other approved means, are considered accessible to qualified persons only. A wall, screen, or fence less than 8 feet high is not considered to prevent access unless it has other features that provide a degree of isolation equivalent to an 8 foot fence. The entrances to all buildings, rooms, or enclosures containing exposed live parts or exposed conductors operating at over 600 volts, nominal, must be kept locked or under the observation of a qualified person at all times.

(a) Electrical installations with exposed live parts must be accessible to qualified persons only.

(b) Electrical installations that are open to unqualified persons must be made with metal-enclosed equipment or enclosed in a vault or in an area, with access controlled by a lock. If metal-enclosed equipment is installed so that the bottom of the enclosure is less than 8 feet above the floor, the door or cover must be kept locked. Metal-enclosed switchgear, unit substations, transformers, pull boxes, connection boxes, and other similar associated equipment must be marked with appropriate caution signs. If equipment is exposed to physical damage from vehicular traffic, guards must be provided to prevent damage. Ventilating or similar openings in metal-enclosed equipment must be designed so that foreign objects inserted through these openings will be deflected from energized parts.

(3) You must provide and maintain enough space around electric equipment to permit ready and safe operation and maintenance of equipment. Where energized parts are exposed, the minimum clear workspace must be at least 6 feet 6 inches high (measured vertically from the floor or platform), or less than 3 feet wide (measured parallel to the equipment). The depth must meet the requirements of Table T. The workspace must be adequate to permit at least a 90-degree opening of doors or hinged panels.

(a) The minimum clear working space in front of electric equipment such as switchboards, control panels, switches, circuit breakers, motor controllers, relays, and similar equipment must be at least that specified in Table T unless otherwise indicated. Distances must be measured from the live parts if they are exposed, or from the enclosure front or opening if the live parts are enclosed. However, working space is not required in back of equipment such as deadfront switchboards or control assemblies where there are no renewable or adjustable parts (such as fuses or switches) on the back and where all connections are accessible from another direction. Where rear access is required to work on deenergized parts on the back of enclosed equipment, a minimum working space of 30 inches horizontally shall be provided.

Table T
Minimum Depth of Clear Working Space
in Front of Electric Equipment

Nominal voltage to ground	Conditions (ft)		
	(a)	(b)	(c)
601 to 2,500	3	4	5
2,501 to 9,000	4	5	6
9,001 to 25,000	5	6	9
25,001 to 75kV1	6	8	10
Above 75kV1	8	10	12

Note: Minimum depth of clear working space in front of electric equipment with a nominal voltage to ground above 25,000 volts may be the same as for 25,000 volts under conditions (a), (b) and (c) for installations built prior to April 16, 1981.

Conditions:

- (a) Exposed live parts on one side and no live or grounded parts on the other side of the working space, or exposed live parts on both sides guarded by suitable wood or other insulating materials. Insulated wire or insulated busbars operating at 300 volts or less are not considered live parts.
- (b) Exposed live parts on one side and grounded parts on the other side. Concrete, brick, or tile walls will be considered grounded surfaces.
- (c) Exposed live parts on both sides of the workspace (not guarded as in (a)) with the operator between.

(b) All working spaces around electric equipment must be adequately lit. The lighting outlets shall be arranged so that anyone changing lamps or making repairs on the lighting system will not be endangered by live parts or other equipment. The points of control must be located so that no one is likely to come in contact with any live part or moving part of the equipment while turning on the lights.

(c) Unguarded live parts above working space must be elevated to at least the height specified below:

Elevation of Unguarded
Energized Parts Above Working Space

Nominal voltage between phases	Minimum elevation
601 to 7,500	8 feet 6 inches

7,501 to 35,000
Over 35kV

9 feet
9 feet + 0.37
inches per kV
above 35kV

Note: Minimum elevation may be 8 feet for installations built prior to April 16, 1981, if the nominal voltage between phases is in the range of 601-6600 volts.

(4) Entrance and access to workspace must meet the following requirements:

(a) At least one entrance that is at least 24 inches wide and 6 feet 6 inches high must be provided to give access to the working space around electric equipment. On switchboard and control panels over 48 inches wide, there must be one entrance at each end of the board where practical. Where bare energized parts at any voltage or insulated energized parts above 600 volts are located adjacent to the entrance, they must be suitably guarded.

(b) Permanent ladders or stairways must be provided to give safe access to the working space around electric equipment installed on platforms, balconies, mezzanine floors, or in attic or roof rooms or spaces.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36230, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-364 Electrical installation and maintenance.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-364, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36403 How must flexible cords and cables be installed and maintained? (1) Extension cords used with portable electric tools and appliances must be three wire and must be fitted with an approved grounding attachment plug and receptacle providing ground continuity.

Exception: This does not apply to cords used with portable tools and equipment provided by an approved system of double insulation or its equivalent.

(2) Worn or frayed electric cables are prohibited.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36403, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36406 How must attachment plugs and receptacles be installed and maintained? (1) Attachment plugs used in work areas must be constructed so that they will endure rough use and have a suitable cord grip to prevent strain on the terminal screws.

(2) Attachment plugs must be approved grounding plugs.

(3) Receptacles for attachment plugs must have approved concealed contacts with a contact for extending ground continuity. Receptacles must be designed and constructed to ensure that the plug can be pulled out without leaving any live parts exposed to accidental contact.

(4) Polarized attachment plugs, receptacles, and cord connectors must be wired to maintain continuity.

(5) Polarized attachment plugs, receptacles, and cord connectors for plugs and polarized plugs must have the terminal intended for connection to the grounded (white)

conductor identified by a metal coating that is mostly white. If the terminal is not visible, its entrance hole must be marked with the word "white," or the color white.

(6) The terminal for the connection of the equipment grounding conductor must be:

(a) A green colored, not easily removed terminal screw with hexagonal head; or

(b) A green colored, hexagonal, not easily removed terminal nut; or

(c) A green colored pressure wire connector.

If the terminal for the grounding conductor is not visible, the conductor entrance hole must be marked with the word "green" or the color green.

Note: Two-wire attachment plugs, unless of the polarity type, need not have their terminals marked for identification.

(7) Where different voltages, or types of current (A.C. or D.C.) are to be supplied by portable cords, receptacles must be designed so that attachment plugs used on the circuits are not interchangeable.

(8) Attachment plugs or other connectors supplying equipment at more than 300 volts must be skirted or otherwise designed so that arcs are confined.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36406, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36409 What must employees do when equipment causes electrical shock? Employees must report all shocks received from electrical equipment, no matter how slight, immediately to you. The equipment causing the shock must be checked and any necessary corrective action taken immediately.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36409, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36412 What grounding and bonding requirements apply to equipment installation and maintenance? (1) The path to ground must have enough carrying capacity to conduct safely the currents likely to be imposed on it; and have low enough impedance to limit the potential above ground and to result in the operation of the overcurrent devices in the circuit.

(2) Driven rod electrodes must, where practical, have a resistance to ground of a maximum of 25 ohms. Where the resistance is over 25 ohms, two electrodes connected in parallel shall be used.

(3) Grounding circuits must be checked to ensure that the circuit between the ground and the grounded power conductor has a resistance that is low enough to permit sufficient current to flow to cause the fuse or circuit breaker to interrupt the current.

(4) Conductors used for bonding and grounding equipment must be large enough to carry the anticipated current.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36412, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36415 What requirements apply to disconnecting means? (1) Disconnecting means must be located or shielded so that employees will not be injured. Using open knife switches is prohibited.

(2) Boxes for disconnecting means must be securely and rigidly fastened to the surface upon which they are mounted, and fitted with covers.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36415, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36418 What requirements apply to identification and load rating of electrical equipment?

(1) Name plates, rating data, and marks of identification on electrical equipment and electrically operated machines must not be removed, defaced or obliterated.

(2) In existing installations, no changes in circuit protection must be made to increase the load beyond the load rating of the circuit wiring, as specified in the National Electrical Code, NFPA 70-1973; ANSI C1-1972, Article 310.

(3) Tampering with, bridging, or using oversize fuses is prohibited. If fuses blow repeatedly, employees must immediately report the trouble to you or to an authorized electrician.

(4) Attempting to start electric motors that kick out repeatedly is prohibited.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36418, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36421 How must equipment be installed in wet locations? (1) Cabinets, cutout boxes, fittings, boxes, and panelboard enclosures in damp or wet locations must be installed to prevent moisture or water from entering and accumulating within the enclosures. In wet locations the enclosures must be weatherproof.

(2) Switches, circuit breakers, and switchboards installed in wet locations must be enclosed in weatherproof enclosures.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36421, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-366 Wiring design and protection.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-366, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36603 How must grounded and grounding conductors be used and identified? (1) A conductor used as a grounded conductor must be identified separately from all other conductors. A conductor used as an equipment grounding conductor must be identified separately from all other conductors.

(2) A grounded conductor must not be attached to any terminal or lead to reverse the designated polarity.

(3) Using a grounding terminal or grounding-type device on a receptacle, cord connector, or attachment plug for anything other than grounding is prohibited.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36603, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36606 What ampere rating must outlet devices have? Outlet devices must have an ampere rating at least equal to the load served.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36606, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36609 What requirements apply to conductors? This section applies to branch circuit, feeder, and service conductors rated 600 volts, nominal, or less and run outdoors as open conductors.

(1) Conductors supported on poles must provide a horizontal climbing space of at least the following:

(a) For power conductors below communication conductors, 30 inches.

(b) For power conductors alone or above communication conductors:

- 300 volts or less, 24 inches;
- More than 300 volts, 30 inches.

(c) For communication conductors below power conductors with power conductors of:

- 300 volts or less, 24 inches;
- More than 300 volts, 30 inches.

(2) Open conductors must provide at least the following minimum clearances:

(a) 10 feet, above finished grade, sidewalks, or from any platform or projection from which they might be reached;

(b) 12 feet, over areas subject to vehicular traffic other than truck traffic;

(c) 15 feet, over areas that are subject to truck traffic; except

(d) 18 feet, over public streets, alleys, roads, and driveways.

(3) Conductors must have a clearance of at least 3 feet from windows, doors, porches, fire escapes, or similar locations. Conductors run above the top level of a window are considered to be out of reach from that window and, therefore, do not have to be 3 feet away.

(4) Conductors must have a clearance of at least 8 feet from the highest point of roofs they pass over.

Exceptions:

(a) Where the voltage between conductors is 300 volts or less and the roof has a slope of at least 4 inches in 12, the clearance from the roofs must be at least 3 feet; or

(b) Where the voltage between conductors is 300 volts or less, the conductors do not pass over more than 4 feet of the overhang portion of the roof, and they are terminated at a through-the-roof raceway or approved support, the clearance from the roofs must be at least 18 inches.

(5) Lamps for outdoor lighting must be located below all live conductors, transformers, or other electric equipment, unless such equipment is controlled by a disconnecting means that can be locked in the open position or unless adequate clearances or other safeguards are provided for relamping operations.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36609, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36612 What design and protection requirements apply to service-entrances? (1) Disconnecting means for service-entrances must meet the following requirements:

(a) Means must be provided to disconnect all conductors in a building or other structure from the service-entrance conductors. The disconnecting means must plainly indicate whether it is in the open or closed position and must be

installed at a readily accessible location nearest the point of entrance of the service-entrance conductors.

(b) Each service disconnecting means must disconnect all ungrounded conductors at the same time.

(2) The following additional requirements apply to services over 600 volts, nominal.

(a) Service-entrance conductors installed as open wires must be guarded to make them accessible only to qualified persons.

(b) Signs warning of high voltage must be posted where other than qualified employees might come in contact with live parts.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36612, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36615 What overcurrent protection must be provided? (1) The following requirements apply to overcurrent protection of circuits rated 600 volts, nominal, or less.

(a) Conductors and equipment must be protected from overcurrent according to their ability to safely conduct current.

(b) Except for motor running overload protection, overcurrent devices must not interrupt the continuity of the grounded conductor unless all conductors of the circuit are opened at the same time.

(c) Except for service fuses, all cartridge fuses that are accessible to other than qualified persons and all fuses and thermal cutouts on circuits over 150 volts to ground must have disconnecting means. This disconnecting means must be installed so that the fuse or thermal cutout can be disconnected from its supply without disrupting service to equipment and circuits unrelated to those protected by the overcurrent device.

(d) Overcurrent devices must be readily accessible to each employee or authorized building management personnel. These overcurrent devices must be located where they will be protected against physical damage and away from easily ignitable material.

(e) Fuses and circuit breakers must be located or shielded so that employees will not be burned or otherwise injured by their operation.

(f) Circuit breakers must meet the following requirements:

(i) Circuit breakers must clearly indicate whether they are in the open (off) or closed (on) position.

(ii) Where circuit breaker handles on switchboards are operated vertically rather than horizontally or rotationally, the up position of the handle must be the closed (on) position.

(iii) If used as switches in 120-volt, fluorescent lighting circuits, circuit breakers must be approved for the purpose and marked "SWD."

(2) Feeders and branch circuits over 600 volts, nominal, must have short-circuit protection.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36615, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36618 What premises wiring systems must be grounded? The following systems that supply premises wiring must be grounded:

(1) All 3-wire DC systems must have their neutral conductor grounded.

(2) Two-wire DC systems operating at 50-300 volts between conductors must be grounded.

Exceptions: This requirement does not apply if:

- (a) They supply only industrial equipment in limited areas and are equipped with a ground detector; or
- (b) They are rectifier-derived from an AC system that meets the requirements of subsections (3), (4), and (5) of this section; or
- (c) They are fire-protective signaling circuits with a maximum current of 0.030 amperes.

(3) AC circuits of less than 50 volts must be grounded if they are installed as overhead conductors outside of buildings or if they are supplied by transformers and the transformer primary supply system is ungrounded or exceeds 150 volts to ground.

(4) AC systems of 50-1000 volts must be grounded under any of the following conditions:

(a) If the system can be grounded so that the maximum voltage to ground on the ungrounded conductors is a maximum of 150 volts;

(b) If the system is nominally rated 480Y/277 volt, 3-phase, 4-wire in which the neutral is used as a circuit conductor;

(c) If the system is nominally rated 240/120 volt, 3-phase, 4-wire in which the midpoint of one phase is used as a circuit conductor; or

(d) If a service conductor is uninsulated.

(5) Exceptions: AC systems of 50-1000 volts are not required to be grounded under any of the following conditions:

(a) If the system is used exclusively to supply industrial electric furnaces for melting, refining, tempering, and the like.

(b) If the system is separately derived and is used exclusively for rectifiers supplying only adjustable speed industrial drives.

(c) If the system is separately derived and is supplied by a transformer that has a primary voltage rating less than 1000 volts, if all of the following conditions are met:

(i) The system is used exclusively for control circuits;

(ii) The conditions of maintenance and supervision ensure that only qualified persons will service the installation;

(iii) Continuity of control power is required; and

(iv) Ground detectors are installed on the control system.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36618, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36621 Must the conductor be grounded for AC premises wiring? For AC premises wiring systems the identified conductor must be grounded.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36621, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36624 What general requirements apply to grounding conductors? (1) For a grounded system, a grounding electrode conductor must be used to connect both the equipment grounding conductor and the grounded circuit conductor to the grounding electrode. Both

the equipment grounding conductor and the grounding electrode conductor must be connected to the grounded circuit conductor on the supply side of the service disconnecting means, or on the supply side of the system disconnecting means or overcurrent devices if the system is separately derived.

(2) For an ungrounded service-supplied system, the equipment grounding conductor must be connected to the grounding electrode conductor at the service equipment. For an ungrounded separately derived system, the equipment grounding conductor must be connected to the grounding electrode conductor at, or ahead of, the system disconnecting means or overcurrent devices.

(3) On extensions of existing branch circuits that do not have an equipment grounding conductor, grounding-type receptacles may be grounded to a grounded cold water pipe near the equipment.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36624, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36627 Must the path to ground be continuous? The path to ground from circuits, equipment, and enclosures must be permanent and continuous.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36627, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36630 What supports, enclosures, and equipment must be grounded? (1) Metal cable trays, metal raceways, and metal enclosures for conductors must be grounded.

Exceptions:

(a) Metal enclosures such as sleeves that are used to protect cable assemblies from physical damage need not be grounded; or

(b) Metal enclosures for conductors added to existing installations of open wire, knob-and-tube wiring, and nonmetallic-sheathed cable need not be grounded if all of the following conditions are met:

(i) Runs are less than 25 feet;

(ii) Enclosures are free from probable contact with ground, grounded metal, metal laths, or other conductive materials; and

(iii) Enclosures are guarded against employee contact.

(2) Metal enclosures for service equipment must be grounded.

(3) Frames of electric ranges, wall-mounted ovens, counter-mounted cooking units, clothes dryers, and metal outlet or junction boxes that are part of the circuit for these appliances must be grounded.

(4) Exposed noncurrent-carrying metal parts of fixed equipment that may become energized must be grounded under any of the following conditions:

(a) If within 8 feet vertically or 5 feet horizontally of ground or grounded metal objects and subject to employee contact;

(b) If located in a wet or damp location and not isolated;

(c) If in electrical contact with metal;

(d) If in a hazardous (classified) location;

(e) If supplied by a metal-clad, metal-sheathed, or grounded metal raceway wiring method;

(f) If equipment operates with any terminal at over 150 volts to the ground; however, the following need not be grounded:

(i) Enclosures for switches or circuit breakers used for other than service equipment and accessible to qualified persons only;

(ii) Metal frames of electrically heated appliances that are permanently and effectively insulated from ground; and

(iii) The cases of distribution apparatus such as transformers and capacitors mounted on wooden poles that are over 8 feet above ground or grade level.

(5) Under any of the conditions below, exposed noncurrent-carrying metal parts of cord-connected and plug-connected equipment that may become energized must be grounded.

(a) When equipment is in hazardous (classified) locations.

(b) When equipment is operated at over 150 volts to ground.

Exception: Guarded motors and metal frames of electrically heated appliances need not be grounded if the appliance frames are permanently and effectively insulated from ground.

(c) When equipment is one of the following:

- Refrigerators, freezers, and air conditioners;
- Clothes-washing, clothes-drying and dishwashing machines, sump pumps, and electrical aquarium equipment;
- Hand-held motor-operated tools;
- The following motor-operated appliances: Hedge clippers, lawn mowers, snow blowers, and wet scrubbers;
- Cord-connected and plug-connected appliances used in damp or wet locations or by employees standing on the ground or on metal floors or working inside of metal tanks or boilers;
 - Tools likely to be used in wet and conductive locations; and
 - Portable hand lamps.

Tools likely to be used in wet and conductive locations need not be grounded if supplied through an isolating transformer with an ungrounded secondary of a maximum of 50 volts. Listed or labeled portable tools and appliances protected by an approved system of double insulation, or its equivalent, need not be grounded. The equipment must be distinctively marked to indicate that the tool or appliance uses an approved system of double insulation.

(6) The metal parts of the following nonelectrical equipment must be grounded: Frames and tracks of electrically operated cranes; frames of nonelectrically driven elevator cars to which electric conductors are attached; hand operated metal shifting ropes or cables of electric elevators, and metal partitions, grill work, and other metal enclosures around equipment of over 750 volts between conductors.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36630, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36633 How must fixed equipment be grounded? (1) Noncurrent-carrying metal parts of fixed equipment, if required to be grounded by this section, must be grounded by an equipment grounding conductor that is contained within the same raceway, cable, or cord, or runs with or encloses the circuit conductors. For DC circuits only, the equipment grounding conductor may be run separately from the circuit conductors.

(2) Electric equipment is considered grounded if it is secured to, and in electrical contact with, a metal rack or

structure that is provided for its support and the metal rack or structure is grounded as described above.

For installations made before May 30, 1982, electric equipment is also considered grounded if it is secured to, and in metallic contact with, the grounded structural metal frame of a building. Metal car frames supported by metal hoisting cables attached to or running over metal sheaves or drums of grounded elevator machines are also considered grounded.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36633, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36636 How must high voltage systems be grounded? Grounded high voltage (1000 volts or more) systems and circuits must meet all requirements of WAC 296-306A-366 and the additional requirements of this section.

(1) Systems supplying portable or mobile high voltage equipment, other than substations installed on a temporary basis, must meet the following requirements:

(a) Portable and mobile high voltage equipment must be supplied from a system having its neutral grounded through an impedance. If a delta-connected high voltage system is used to supply the equipment, a system neutral must be derived.

(b) Exposed noncurrent-carrying metal parts of portable and mobile equipment must be connected by an equipment grounding conductor to the point at which the system neutral impedance is grounded.

(c) Ground-fault detection and relaying must be provided to automatically deenergize any high voltage system component that has developed a ground fault. The continuity of the equipment grounding conductor must be continuously monitored to deenergize automatically the high voltage feeder to the portable equipment on loss of continuity of the equipment grounding conductor.

(d) The grounding electrode to which the portable or mobile equipment system neutral impedance is connected must be isolated from and separated in the ground by at least 20 feet from any other system or equipment grounding electrode. There must be no direct connection between the grounding electrodes, such as buried pipe, fence, etc.

(2) All noncurrent-carrying metal parts of portable equipment and fixed equipment including their associated fences, housings, enclosures, and supporting structures shall be grounded. However, equipment that is guarded by location and isolated from ground need not be grounded. Additionally, pole-mounted distribution apparatus over 8 feet above ground or grade level need not be grounded.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36636, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-368 Wiring methods, components, and equipment for general use.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-368, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36803 Does this section apply to factory-assembled equipment? WAC 296-306A-368 does

not apply to conductors that are an integral part of factory-assembled equipment.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36803, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36806 What wiring methods must be used for temporary wiring? Temporary electrical power and lighting wiring methods may be of a class less than would be required for a permanent installation. All requirements for permanent wiring apply to temporary wiring installations, except as indicated in this section.

(1) Temporary electrical power and lighting installations 600 volts, nominal, or less must only be used:

(a) During and for remodeling, maintenance, repair, or demolition of buildings, structures, or equipment, and similar activities;

(b) For experimental or development work; and

(c) For a maximum of 90 days for Christmas lighting and similar purposes.

(2) Temporary wiring over 600 volts, nominal, must only be used during periods of tests, experiments, or emergencies.

(3) General requirements for temporary wiring.

(a) Working spaces, walkways, and similar locations must be kept clear of power cords.

(b) All temporary wiring must be grounded. (See NFPA 70 Art. 250.)

(c) All wiring equipment must be maintained as vapor-tight, dust-tight, or fiber-tight as their approval requires. There must be no loose or missing screws, gaskets, threaded connections, or other conditions that impair the required tightness.

(d) Take precautions to make necessary open wiring accessible only to authorized personnel.

(e) Feeders must originate in an approved distribution center. The conductors must be run as multiconductor cord or cable assemblies, or, where not subject to physical damage, they may be run as open conductors on insulators not more than 10 feet apart.

(f) Branch circuits must originate in an approved power outlet or panelboard. Conductors must be multiconductor cord or cable assemblies or open conductors. If run as open conductors they must be fastened at ceiling height every 10 feet. A branch-circuit conductor must not be laid on the floor. Each branch circuit that supplies receptacles or fixed equipment must have a separate equipment grounding conductor if run as open conductors.

(g) Receptacles must be of the grounding type. Unless installed in a complete metallic raceway, each branch circuit must have a separate equipment grounding conductor and all receptacles must be electrically connected to the grounding conductor.

(h) A bare conductor or an earth return must not be used to wire any temporary circuit.

(i) Suitable disconnecting switches or plug connectors must be installed to permit the disconnection of all ungrounded conductors of each temporary circuit.

(j) Lamps for general illumination must be protected from accidental contact or breakage. Lamps must be elevated at least 7 feet from normal working surface or by a suitable fixture or lampholder with a guard.

(k) Flexible cords and cables must be protected from accidental damage. Sharp corners and projections must be avoided. Where passing through doorways or other pinch points, flexible cords and cables must be protected to avoid damage.

(4) General requirements for temporary lighting.

(a) Temporary lights must have guards to prevent accidental contact with the bulb.

Note: Guards are not required when the entire bulb is below the rim and completely surrounded and protected by the reflector.

(b) Temporary lights must have heavy duty electric cords with connections and insulation maintained in safe condition.

(c) Temporary lights must not be suspended by their electric cords unless cords and lights are designed for suspension.

(d) Brass shell, paper-lined lamp holders are prohibited.

(e) Portable extension lamps used where flammable vapors or gases, combustible dusts, or easily ignitable fibers or flyings are present, must be specifically approved as complete assemblies for the type of hazard.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36806, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36809 When may cable trays be used? (1) Only the following may be installed in cable tray systems:

(a) Mineral-insulated metal-sheathed cable (Type MI);

(b) Armored cable (Type AC);

(c) Metal-clad cable (Type MC);

(d) Power-limited tray cable (Type PLTC);

(e) Nonmetallic-sheathed cable (Type NM or NMC);

(f) Shielded nonmetallic-sheathed cable (Type SNM);

(g) Multiconductor service-entrance cable (Type SE or USE);

(h) Multiconductor underground feeder and branch-circuit cable (Type UF);

(i) Power and control tray cable (Type TC);

(j) Other factory-assembled, multiconductor control, signal, or power cables that are specifically approved for installation in cable trays; or

(k) Any approved conduit or raceway with its contained conductors.

(2) In industrial establishments only, where conditions of maintenance and supervision ensure that only qualified persons will service the installed cable tray system, the following cables may also be installed in ladder, ventilated trough, or 4 inch ventilated channel-type cable trays:

Single conductor cables that are 250 MCM or larger and are Types RHH, RHW, MV, USE, or THW, and other 250 MCM or larger single conductor cables if specifically approved for installation in cable trays. Where exposed to direct rays of the sun, cables must be sunlight-resistant.

(3) Cable trays in hazardous (classified) locations must contain only the cable types permitted in such locations.

Exception: Cable tray systems must not be used in hoistways or where subjected to severe physical damage.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36809, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36812 What requirements apply to open wiring on insulators? (1) Open wiring on insulators is only permitted on systems of 600 volts, nominal, or less for industrial or agricultural establishments and for services.

(2) Conductors must be rigidly supported on noncombustible, nonabsorbent insulating materials and must not contact any other objects.

(3) In dry locations with no exposure to severe physical damage, conductors may be separately enclosed in flexible nonmetallic tubing. The tubing must be in continuous lengths a maximum of 15 feet and secured to the surface by straps at maximum intervals of 4 feet 6 inches.

(4) Open conductors must be separated from contact with walls, floors, and wood cross members, or partitions through which they pass by tubes or bushings of noncombustible, nonabsorbent insulating material. If the bushing is shorter than the hole, a waterproof sleeve of nonconductive material must be inserted in the hole and an insulating bushing slipped into the sleeve at each end to keep the conductors completely out of contact with the sleeve. Each conductor must be carried through a separate tube or sleeve.

(5) Conductors within 7 feet of the floor are considered exposed to physical damage. Where open conductors cross ceiling joints and wall studs and are exposed to physical damage, they must be protected.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36812, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36815 What wiring requirements apply to cabinets, boxes, and fittings? (1) Conductors entering boxes, cabinets, or fittings must be protected from abrasion, and openings through which conductors enter must be closed. Unused openings in cabinets, boxes, and fittings must also be closed.

(2) All pull boxes, junction boxes, and fittings must have covers approved for the purpose. All metal covers must be grounded. In completed installations each outlet box must have a cover, faceplate, or fixture canopy. A cover of an outlet box with holes through which a flexible cord pendant passes must have bushings designed for the purpose or have a smooth, well-rounded surface for the cord to run on.

(3) All pull and junction boxes for systems over 600 volts, nominal, must meet the following requirements:

(a) Boxes must provide a complete enclosure for the contained conductors or cables.

(b) Boxes must be closed by suitable covers securely fastened in place. Underground box covers that weigh over 100 pounds meet this requirement. Covers for boxes must be permanently marked "HIGH VOLTAGE." The marking must be on the outside of the box cover and must be readily visible and legible.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36815, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36818 What requirements apply to switches? (1) Single-throw knife switches must be connected so that the blades are dead when the switch is in the open position. Single-throw knife switches must be placed so that gravity will not tend to close them. Single-throw knife switches approved for use in the inverted position must have

a locking device that keeps the blades open when set. Double-throw knife switches may be mounted so that the throw will be either vertical or horizontal. However, if the throw is vertical a locking device must be provided to ensure that the blades remain open when so set.

(2) Flush snap switches that are mounted in ungrounded metal boxes and located within reach of conducting floors or other conducting surfaces must have faceplates of nonconducting, noncombustible material.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36818, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36821 Where must switchboards and panelboards be located? Switchboards that have any exposed live parts must be located in permanently dry locations and accessible only to qualified persons. Panelboards must be mounted in cabinets, cutout boxes, or enclosures approved for the purpose and must be dead front. However, panelboards other than the dead front externally operable type are permitted where accessible only to qualified persons. Exposed blades of knife switches must be dead when open.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36821, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36824 When must conductors be insulated? All conductors used for general wiring must be insulated unless otherwise permitted in this section. The conductor insulation must be approved for the voltage, operating temperature, and location of use. Insulated conductors must be distinguishable by appropriate color or other means as grounded conductors, ungrounded conductors, or equipment grounding conductors.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36824, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36827 When may flexible cords and cables be used? (1) Flexible cords and cables must be approved and suitable for conditions of use and location. Flexible cords and cables must be used only for:

- (a) Pendants;
- (b) Wiring of fixtures;
- (c) Connection of portable lamps or appliances;
- (d) Elevator cables;
- (e) Wiring of cranes and hoists;
- (f) Connection of stationary equipment to facilitate frequent interchange;
- (g) Prevention of the transmission of noise or vibration;
- (h) Appliances where the fastening means and mechanical connections are designed to permit removal for maintenance and repair; or
- (i) Data processing cables approved as a part of the data processing system.

(2) If used as permitted above, the flexible cord must have an attachment plug and shall be energized from an approved receptacle outlet.

(3) Unless permitted in subsection (1) of this section, flexible cords and cables must not be used:

- (a) As a substitute for the fixed wiring of a structure;
- (b) Where run through holes in walls, ceilings, or floors;

(c) Where run through doorways, windows, or similar openings;

(d) Where attached to building surfaces; or

(e) Where concealed behind building walls, ceilings, or floors.

(4) Flexible cords used in show windows and showcases must be Type S, SO, SJ, SJO, ST, STO, SJT, SJTO, or AFS except for the wiring of chain-supported lighting fixtures and supply cords for portable lamps and other merchandise being displayed or exhibited.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36827, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36830 How must flexible cords and cables be identified, spliced, and terminated? (1) A conductor of a flexible cord or cable that is used as a grounded conductor or an equipment grounding conductor must be distinguishable from other conductors. Types SJ, SJO, SJT, SJTO, S, SO, ST, and STO must be durably marked on the surface with the type designation, size, and number of conductors.

(2) Flexible cords must be used only in continuous lengths without splice or tap. Vulcanized splices or equivalent means such as systems using shrinkable materials may be used to repair flexible cords. Hard service flexible cords No. 12 or larger may be repaired by splice if the splice retains the insulation, outer sheath properties, and usage characteristics of the cord being spliced.

(3) Flexible cords must be connected to devices and fittings so that strain relief is provided to prevent pull from being directly transmitted to joints or terminal screws.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36830, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36833 What requirements apply to multiconductor portable cable? Multiconductor portable cable for use in supplying power to portable or mobile equipment at over 600 volts, nominal, must consist of No. 8 or larger conductors employing flexible stranding. Cables operated at over 2,000 volts must be shielded to confine the voltage stresses to the insulation. Grounding conductors must be provided. Connectors for these cables must be locking with provisions to prevent their opening or closing while energized. Strain relief must be provided at connections and terminations. Portable cables must not be operated with splices unless the splices are permanent molded, vulcanized, or other approved type. Termination enclosures must be suitably marked with a high voltage hazard warning, and terminations must be accessible only to authorized and qualified personnel.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36833, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36836 When may fixture wires be used? (1) A fixture wire must be approved for the voltage, temperature, and location of use. A fixture wire used as a grounded conductor must be identified.

(2) Fixture wires may be used:

(a) For installation in lighting fixtures and in similar equipment where enclosed or protected and not subject to bending or twisting in use; or

(b) For connecting lighting fixtures to the branch-circuit conductors supplying the fixtures.

(3) Fixture wires must not be used as branch-circuit conductors except as permitted for Class 1 power limited circuits.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36836, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36839 What requirements apply to wiring for lighting fixtures, lampholders, lamps, and receptacles? (1) Fixtures, lampholders, lamps, rosettes, and receptacles must have no live parts normally exposed to employee contact. However, rosettes and cleat-type lampholders and receptacles located at least 8 feet above the floor may have exposed parts.

(2) Handlamps of the portable type supplied through flexible cords must have a handle of molded composition or other material approved for the purpose, and a substantial guard must be attached to the lampholder or the handle.

(3) Lampholders of the screw-shell type must be installed for use as lampholders only. Lampholders installed in wet or damp locations must be weatherproof.

(4) Fixtures installed in wet or damp locations must be approved for the purpose and must be constructed or installed so that water cannot enter or accumulate in wireways, lampholders, or other electrical parts.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36839, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36842 What requirements apply to wiring for receptacles, cord connectors, and attachment plugs (caps)? (1) Receptacles, cord connectors, and attachment plugs must be constructed so that no receptacle or cord connector will accept an attachment plug with a different voltage or current rating than that for which the device is intended. However, a 20-ampere T-slot receptacle or cord connector may accept a 15-ampere attachment plug of the same voltage rating.

(2) A receptacle installed in a wet or damp location must be suitable for the location.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36842, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36845 What requirements apply to wiring for appliances? (1) Appliances, other than those in which the current-carrying parts at high temperatures are necessarily exposed, must have no live parts normally exposed to employee contact.

(2) Each appliance must have a disconnecting means.

(3) Each appliance must be marked with its rating in volts and amperes or volts and watts.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36845, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36848 What requirements apply to wiring for motors, motor circuits, and controllers? (1) If specified that one piece of equipment must be "in sight from" another piece of equipment, one shall be visible and not more than 50 feet from the other.

(2) Disconnecting means must meet the following requirements:

(a) A disconnecting means must be located in sight from the controller location. However, a single disconnecting means may be located adjacent to a group of coordinated controllers mounted adjacent to each other or a multimotor continuous process machine. The controller disconnecting means for motor branch circuits over 600 volts, nominal, may be out of sight of the controller, if the controller is marked with a warning label giving the location and identification of the disconnecting means which is to be locked in the open position.

(b) The disconnecting means must disconnect the motor and the controller from all ungrounded supply conductors and must be designed so that no pole can be operated independently.

(c) If a motor and the driven machinery are not in sight from the controller location, the installation must meet one of the following conditions:

(i) The controller disconnecting means must be able to be locked in the open position.

(ii) A manually operable switch that will disconnect the motor from its source of supply must be placed in sight from the motor location.

(d) The disconnecting means must plainly indicate whether it is in the open (off) or closed (on) position.

(e) The disconnecting means must be readily accessible. If more than one disconnect is provided for the same equipment, only one need be readily accessible.

(f) An individual disconnecting means must be provided for each motor, but a single disconnecting means may be used for a group of motors under any of the following conditions:

(i) If a number of motors drive special parts of a single machine or piece of apparatus, such as a metal or wood-working machine, crane, or hoist; or

(ii) If a group of motors is under the protection of one set of branch-circuit protective devices; or

(iii) If a group of motors is in a single room in sight from the location of the disconnecting means.

(3) Motors, motor-control apparatus, and motor branch-circuit conductors must be protected against overheating from motor overloads or failure to start, and against short-circuits or ground faults. Overload protection is not required if it will stop a motor where a shutdown is likely to introduce additional or increased hazards, as in the case of fire pumps, or where continued operation of a motor is necessary for a safe shutdown of equipment or process and motor overload sensing devices are connected to a supervised alarm.

(4) Live parts of all voltages must be protected according to the following:

(a) Stationary motors with commutators, collectors, and brush rigging located inside of motor end brackets and not conductively connected to supply circuits operating at more than 150 volts to ground may have those parts unguarded. Exposed live parts of motors and controllers operating at 50 volts or more between terminals must be guarded against accidental contact by any of the following:

(i) By installation in a room or enclosure that is accessible only to qualified persons;

(ii) By installation on a suitable balcony, gallery, or platform, elevated and arranged to exclude unqualified persons; or

(iii) By elevation 8 feet or more above the floor.

(b) Where live parts of motors or controllers operating at over 150 volts to ground are guarded against accidental contact only by location, and where adjustment or other attendance may be necessary during the operation of the apparatus, suitable insulating mats or platforms must be provided so that the attendant cannot readily touch live parts unless standing on the mats or platforms.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36848, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36851 What requirements apply to wiring for transformers? (1) This section applies to the installation of all transformers.

Exceptions:

(a) Current transformers;

(b) Dry-type transformers installed as a component part of other apparatus;

(c) Transformers that are an integral part of a high frequency or electrostatic-coating apparatus;

(d) Transformers used with Class 2 and Class 3 circuits, sign and outline lighting, electric discharge lighting, and power-limited fire-protective signaling circuits; and

(e) Liquid-filled or dry-type transformers used for research, development, or testing, where effective safeguard arrangements are provided.

(2) The operating voltage of exposed live parts of transformer installations must be indicated by warning signs or visible markings on the equipment or structure.

(3) Dry-type, high fire point liquid-insulated, and askarel-insulated transformers installed indoors and rated over 35kV must be in a vault.

(4) If they present a fire hazard to employees, oil-insulated transformers installed indoors must be in a vault.

(5) Combustible material, combustible buildings and parts of buildings, fire escapes, and door and window openings must be safeguarded from fires that may originate in oil-insulated transformers attached or adjacent to a building or combustible material.

(6) Transformer vaults must be constructed to contain fire and combustible liquids within the vault and to prevent unauthorized access. Locks and latches must be arranged so that a vault door can be readily opened from the inside.

(7) Any pipe or duct system foreign to the vault installation must not enter or pass through a transformer vault.

(8) Materials must not be stored in transformer vaults.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36851, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36854 What requirements apply to wiring for capacitors? (1) All capacitors, except surge capacitors or capacitors included as a component part of other apparatus, must have an automatic means of draining the stored charge after the capacitor is disconnected from its source of supply.

(2) Capacitors rated over 600 volts, nominal, must meet the following additional requirements:

(a) Isolating or disconnecting switches (with no interrupting rating) must be interlocked with the load interrupting device or must have prominently displayed caution signs to prevent switching load current.

(b) For series capacitors, the proper switching must be ensured by any of the following:

- (i) Mechanically sequenced isolating and bypass switches;
- (ii) Interlocks; or
- (iii) Switching procedure prominently displayed at the switching location.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36854, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36857 How must storage batteries be ventilated? You must ensure that there is sufficient diffusion and ventilation of gases from storage batteries to prevent the accumulation of explosive mixtures.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36857, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-36860 What other miscellaneous requirements apply to wiring methods? (1) Metal raceways, cable armor, and other metal enclosures for conductors must be metallically joined into a continuous electric conductor and must be connected to all boxes, fittings, and cabinets to provide effective electrical continuity.

(2) All wiring systems are prohibited from being installed in ducts used to transport dust, loose stock or flammable vapors. All wiring system are prohibited from being installed in any duct used for vapor removal or for ventilation of commercial-type cooking equipment, or in any shaft containing only such ducts.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-36860, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-370 Special purpose equipment and installations.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-370, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-37003 What requirements apply to cranes, hoists, and runways? The installation of electric equipment and wiring used with cranes, monorail hoists, hoists, and all runways must meet the following requirements:

(1) Disconnecting means must meet the following requirements:

(a) A readily accessible disconnecting means is provided between the runway contact conductors and the power supply.

(b) Another disconnecting means, capable of being locked in the open position, is provided in the leads from the runway contact conductors or other power supply on any crane or monorail hoist.

(i) If this additional disconnection means is not readily accessible from the crane or monorail hoist operating station, means is provided at the operating station, to open the power circuit to all motors of the crane or monorail hoist.

(ii) The additional disconnect may be omitted if a monorail hoist or hand-propelled crane bridge installation meets all of the following:

(A) The unit is floor controlled;

(B) The unit is within view of the power supply disconnecting means; and

(C) No fixed work platform has been provided for servicing the unit.

(2) A limit switch or other device shall be provided to prevent the load block from passing the safe upper limit of travel of any hoisting mechanism.

(3) The dimension of the working space in the direction of access to live parts that may require examination, adjustment, servicing, or maintenance while alive must be a minimum of 2 feet 6 inches. Where controls are enclosed in cabinets, the door must either open at least 90 degrees or be removable.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-37003, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-37006 What requirements apply to elevators, dumbwaiters, escalators, and moving walks?

(1) Elevators, dumbwaiters, escalators, and moving walks must have a single means for disconnecting all ungrounded main power supply conductors for each unit.

(2) If interconnections between control panels are necessary for operation of the system on a multicar installation that remains energized from a source other than the disconnecting means, a warning sign must be mounted on or adjacent to the disconnecting means. The sign must be clearly legible and shall read "Warning—Parts of the control panel are not deenergized by this switch."

(3) If control panels are not located in the same space as the drive machine, they must be located in cabinets with doors or panels capable of being locked closed.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-37006, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-37009 What requirements apply to the disconnecting means for electric welders?

(1) A disconnecting means must be provided in the supply circuit for each motor-generator arc welder, and for each AC transformer and DC rectifier arc welder that is not equipped with a disconnect mounted as an integral part of the welder.

(2) A switch or circuit breaker must be provided by which each resistance welder and its control equipment can be isolated from the supply circuit. The ampere rating of this disconnecting means must not be less than the supply conductor ampacity.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-37009, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-37012 What requirements apply to electrically driven or controlled irrigation machines?

(1) If an electrically driven or controlled irrigation machine has a stationary point, a driven ground rod must be connected to the machine at the stationary point for lightning protection.

(2) The main disconnecting means for a center pivot irrigation machine must be located at the point of connection of electrical power to the machine and must be readily accessible and capable of being locked in the open position. A disconnecting means must be provided for each motor and controller.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-37012, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-372 Hazardous (classified) locations.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-372, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-37203 What does this section cover? WAC 296-306A-372 covers the requirements for electric equipment and wiring in locations that are classified based on the properties of the flammable vapors, liquids or gases, or combustible dusts or fibers that may be present and the likelihood that a flammable combustible concentration or quantity is present. Each room, section, or area must be considered individually to determine its classification.

All requirements in this part apply to hazardous locations, unless otherwise indicated.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-37203, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-37206 What classifications apply to this section? These hazardous locations are classified as follows:

(1) "Class I locations" are those in which flammable gases or vapors are or may be present in the air in quantities sufficient to produce explosive or ignitable mixtures. They include the following:

(a) Class I, Division 1 locations are those where:

(i) Hazardous concentrations of flammable gases or vapors may exist under normal operating conditions; or

(ii) Hazardous concentrations of such gases or vapors may exist frequently because of repair or maintenance operations or because of leakage; or

(iii) Breakdown or faulty operation of equipment or processes might release hazardous concentrations of flammable gases or vapors, and might also cause simultaneous failure of electric equipment.

This classification usually includes locations where:

- Volatile flammable liquids or liquefied flammable gases are transferred from one container to another;

- Interiors of spray booths and areas in the vicinity of spraying and painting operations where volatile flammable solvents are used;

- Locations containing open tanks or vats of volatile flammable liquids;

- Drying rooms or compartments for the evaporation of flammable solvents;

- Locations containing fat and oil extraction equipment using volatile flammable solvents;

- Gas generator rooms and other portions of gas manufacturing plants where flammable gas may escape;

- Inadequately ventilated pump rooms for flammable gas or for volatile flammable liquids;

- The interiors of refrigerators and freezers in which volatile flammable materials are stored in open, lightly stoppered, or easily ruptured containers; and

- All other locations where ignitable concentrations of flammable vapors or gases are likely to occur in the course of normal operations.

(b) Class I, Division 2 locations are those where:

(i) Volatile flammable liquids or flammable gases are handled, processed, or used, but in which the hazardous liquids, vapors, or gases are normally confined within closed containers or systems from which they can escape only in an accidental rupture or breakdown of containers or systems, or in case of abnormal operation of equipment; or

(ii) Hazardous concentrations of gases or vapors are normally prevented by positive mechanical ventilation, and which might become hazardous through failure or abnormal operation of the ventilating equipment; or

(iii) They are adjacent to a Class I, Division 1 location, and to which hazardous concentrations of gases or vapors might occasionally be communicated unless prevented by adequate positive-pressure ventilation from a source of clean air, and effective safeguards against ventilation failure are provided.

This classification usually includes locations where:

- Volatile flammable liquids or flammable gases or vapors are used, but which would become hazardous only in case of an accident or unusual operating condition. The quantity of flammable material that might escape in case of accident, the adequacy of ventilating equipment, the total area involved, and the record of the industry or business with respect to explosions or fires are all factors to consider in determining the classification.

- Piping without valves, checks, meters, and similar devices would not ordinarily introduce a hazardous condition even though used for flammable liquids or gases. Locations used for the storage of flammable liquids or a liquefied or compressed gases in sealed containers are not normally considered hazardous unless also subject to other hazardous conditions.

- Electrical conduits and their enclosures separated from process fluids by a single seal or barrier are Division 2 locations if the outside of the conduit and enclosures is a nonhazardous location.

(2) "Class II locations" are those that are hazardous because of the presence of combustible dust. They include the following:

(a) Class II, Division 1 locations are those where:

(i) Combustible dust is or may be suspended in the air under normal operating conditions, in quantities sufficient to produce explosives or ignitable mixtures; or

(ii) Mechanical failure or abnormal operation of machinery or equipment might produce explosive or ignitable, and might also provide a source of ignition through simultaneous failure of electric equipment, operation of protection devices, or from other causes; or

(iii) Combustible dusts of an electrically conductive nature may be present.

This classification may include areas of grain handling and processing plants, starch plants, sugar-pulverizing plants, malting plants, hay-grinding plants, coal pulverizing plants, areas where metal dusts and powders are produced or processed, and other similar locations that contain dust producing machinery and equipment (except where the equipment is dust-tight or vented to the outside). These areas would have combustible dust in the air, under normal operating conditions, in quantities sufficient to produce explosive or ignitable mixtures.

Combustible dusts that are electrically nonconductive include dusts produced in the handling and processing of grain and grain products, pulverized sugar and cocoa, dried egg and milk powders, pulverized spices, starch and pastes, potato and wood flour, oil meal from beans and seed, dried hay, and other organic materials that may produce combustible dusts when processed or handled. Dusts containing magnesium or aluminum are particularly hazardous and the use of extreme caution is necessary to avoid ignition and explosion.

(b) Class II, Division 2 locations are those where:

(i) Combustible dust is not normally suspended in the air in quantities sufficient to produce explosive or ignitable mixtures; and dust accumulations are normally insufficient to interfere with the normal operation of electrical equipment or other apparatus; or

(ii) Dust may be in suspension in the air as a result of infrequent malfunctioning of handling or processing equipment, and resulting dust accumulations may be ignitable by abnormal operation or failure of electrical equipment or other apparatus.

This classification includes locations where dangerous concentrations of suspended dust would not be likely but where dust accumulations might form on or in the vicinity of electric equipment. These areas may contain equipment from which appreciable quantities of dust would escape under abnormal operating conditions or be adjacent to a Class II Division 1 location into which an explosive or ignitable concentration of dust may be suspended under abnormal operating conditions.

(3) "Class III locations" are those that are hazardous because of the presence of easily ignitable fibers or flyings but in which such fibers or flyings are not likely to be suspended in the air in quantities sufficient to produce ignitable mixtures. They include the following:

(a) Class III, Division 1 locations are those where easily ignitable fibers or materials producing combustible flyings are handled, manufactured, or used.

Such locations usually include combustible fiber manufacturing and processing plants; cotton gins and cottonseed mills; flax-processing plants; and industries involving similar hazardous processes or conditions.

Easily ignitable fibers and flyings include rayon, cotton (including cotton linters and cotton waste), sisal or henequen, istle, jute, hemp, tow, cocoa fiber, oakum, baled waste kapok, Spanish moss, excelsior, and other materials of similar nature.

(b) Class III, Division 2 locations are those where easily ignitable fibers are stored or handled, except in process of manufacture.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-37206, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-37209 What equipment, wiring methods, and installations may be used in hazardous locations? Equipment, wiring methods, and installations of equipment in hazardous locations must be intrinsically safe, or approved for the hazardous location, or safe for the hazardous location. Requirements for each of these options are as follows:

(1) Equipment and associated wiring approved as intrinsically safe are permitted in any hazardous location for which it is approved.

(2) Requirements to be approved for the hazardous location:

(a) Equipment must be approved for the class of location and for the ignitable or combustible properties of the specific gas, vapor, dust, or fiber that will be present.

(b) Equipment must be marked to show the class, group, and operating temperature or temperature range, based on operation in a 40 degrees C ambient, for which it is approved. The temperature marking must be a maximum of the ignition temperature of the specific gas or vapor to be encountered. The following provisions apply to specific equipment:

(i) Nonheat-producing equipment, such as junction boxes, conduit, and fittings, and heat-producing equipment with a maximum temperature of 100 degrees C (212 degrees F) need not have a marked operating temperature or temperature range.

(ii) Fixed lighting fixtures marked for use in Class I, Division 2 locations only, need not be marked to indicate the group.

(iii) Fixed general-purpose equipment in Class I locations (other than lighting fixtures) that is acceptable for use in Class I, Division 2 locations need not be marked with the class, group, division, or operating temperature.

(iv) Fixed dust-tight equipment (other than lighting fixtures) that is acceptable for use in Class II, Division 2 and Class III locations need not be marked with the class, group, division, or operating temperature.

(3) Equipment that is safe for the location shall be of a type and design that provides protection from the hazards arising from combustible and flammable vapors, liquids, gases, dusts, or fibers.

Note: Equipment that meets the requirements of The National Electrical Code, NFPA 70, shall be considered in compliance with the requirements of WAC 296-306A-372.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-37209, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-37212 How must conduit be installed in hazardous locations? All conduits must be threaded and wrench-tight. Where it is impractical to make a threaded joint tight, a bonding jumper must be used.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-37212, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-37215 Which equipment may be used in Division 1 and 2 locations? Equipment that has been approved for a Division 1 location may be installed in a Division 2 location of the same class and group. General-purpose equipment or equipment in general-purpose enclosures may be installed in Division 2 locations if the equipment does not constitute a source of ignition under normal operating conditions.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-37215, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-37218 What requirements apply to motors and generators used in hazardous locations? In

Class I, Division 1 locations, motors, generators and other rotating electric machinery must be:

(1) Approved for Class I, Division 1 locations (explosion-proof); or

(2) Of the totally enclosed type supplied with positive-pressure ventilation from a source of clean air with discharge to a safe area, arranged to prevent energizing of the machine until ventilation has been established and the enclosure has been purged with at least 10 volumes of air, and also arranged to automatically deenergize the equipment when the air supply fails; or

(3) Of the totally enclosed inert-gas-filled type supplied with a suitable reliable source of inert gas for pressuring the enclosure, with devices provided to ensure a positive pressure in the enclosure and arranged to automatically deenergize the equipment when the gas supply fails; or

(4) Of a type designed to be submerged in a liquid that is flammable only when vaporized and mixed with air, or in a gas or vapor at a pressure greater than atmospheric and which is flammable only when mixed with air; and the machine is arranged to prevent energizing it until it has been purged with the liquid or gas to exclude air, and also arranged to automatically deenergize the equipment when the supply of liquid, or gas or vapor fails or the pressure is reduced to atmospheric.

Totally enclosed type (2) and (3) motors must have no external surface with a Celsius operating temperature greater than 80% of the ignition temperature of the gas or vapor involved, as determined by ASTM test procedure (Designation: D-2155-69). Appropriate devices must be provided to detect an increase in temperature of the motor beyond design limits and automatically deenergize the equipment or provide an adequate alarm. Auxiliary equipment must be approved for the location in which it is installed.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-37218, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-374 Special systems.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-374, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-37403 What requirements apply to systems over 600 volts, nominal? (1) Wiring methods for fixed installations over 600 volts, nominal, must meet the following requirements:

(a) Above-ground conductors must be installed in rigid metal conduit, in intermediate metal conduit, in cable trays, in cablebus, in other suitable raceways, or as open runs of metal-clad cable suitable for the use and purpose. Open runs of nonmetallic-sheathed cable or of bare conductors or busbars must be installed in locations accessible only to qualified persons. Metallic shielding components, such as tapes, wires, or braids for conductors, must be grounded. Open runs of insulated wires and cables with a bare lead sheath or a braided outer covering must be supported to prevent physical damage to the braid or sheath.

(b) Conductors emerging from the ground must be enclosed in approved raceways.

(2) Interrupting and isolating devices must meet the following requirements:

(a) Circuit breaker installations located indoors must consist of metal-enclosed units or fire-resistant cell-mounted units. Circuit breakers must be open mounted only in locations that are accessible only to qualified persons. A means of indicating the open and closed position of circuit breakers must be provided.

(b) Fused cutouts installed in buildings or transformer vaults must be approved for the purpose. They must be readily accessible for fuse replacement.

(c) A means must be provided to completely isolate equipment for inspection and repairs. Isolating means that are not designed to interrupt the load current of the circuit must be either interlocked with an approved circuit interrupter or provided with a sign warning against opening them under load.

(3) Mobile and portable equipment must meet the following requirements:

(a) A metallic enclosure must be provided on the mobile machine for enclosing the terminals of the power cable. The enclosure must include provisions for a solid connection for the ground wire terminal to effectively ground the machine frame. The method of cable termination used must prevent any strain or pull on the cable from stressing the electrical connections. The enclosure must be lockable so only authorized qualified persons may open it and must be marked with a sign warning of the presence of energized parts.

(b) All energized switching and control parts must be enclosed in grounded metal cabinets or enclosures. Circuit breakers and protective equipment must have the operating means projecting through the metal cabinet or enclosure so these units can be reset without opening locked doors. Enclosures and metal cabinets must be locked so that only authorized qualified persons have access and must be marked with a sign warning of the presence of energized parts. Collector ring assemblies on revolving machines (shovels, draglines, etc.) must be guarded.

(4) Tunnel installations of high-voltage power distribution and utilization equipment that is portable or mobile, such as substations, trailers, cars, mobile shovels, draglines, hoists, drills, dredges, compressors, pumps, conveyors, and underground excavators must meet the following requirements:

(a) Conductors in tunnels must be installed in one or more of the following:

- (i) Metal conduit or other metal raceway;
- (ii) Type MC cable; or
- (iii) Other approved multiconductor cable.

Conductors must also be located or guarded to protect them from physical damage. Multiconductor portable cable may supply mobile equipment. An equipment grounding conductor must be run with circuit conductors inside the metal raceway or inside the multiconductor cable jacket. The equipment grounding conductor may be insulated or bare.

(b) Bare terminals of transformers, switches, motor controllers, and other equipment must be enclosed to prevent accidental contact with energized parts. Enclosures used in tunnels must be drip-proof, weatherproof, or submersible as required by environmental conditions.

(c) A disconnecting means that simultaneously opens all ungrounded conductors must be installed at each transformer or motor location.

(d) All nonenergized metal parts of electric equipment and metal raceways and cable sheaths must be effectively grounded and bonded to all metal pipes and rails at the portal and at maximum intervals of 1000 feet throughout the tunnel.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-37403, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-37406 What requirements apply to emergency power systems? This section applies to circuits, systems, and equipment intended to supply power for illumination and special loads, in the event of failure of the normal supply.

(1) Emergency circuit wiring must be kept entirely independent of all other wiring and equipment and must not enter the same raceway, cable, box, or cabinet as other wiring.

Exception: This does not apply where common circuit elements suitable for the purpose are required, or for transferring power from the normal to the emergency source.

(2) Where emergency lighting is necessary, the system must be arranged so that the failure of any individual lighting element, such as a burned out light bulb, cannot leave any space in total darkness.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-37406, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-37409 How are Class 1, Class 2, and Class 3 remote control, signaling, and power-limited circuits classified? (1) Class 1, Class 2, or Class 3 remote control, signaling, or power-limited circuits are characterized by their usage and electrical power limitation which differentiates them from light and power circuits. These circuits are classified according to their voltage and power limitations as follows.

(a) Class 1 circuits.

(i) A Class 1 power-limited circuit is supplied from a source with a maximum rated output of 30 volts and 1000 volt-amperes.

(ii) A Class 1 remote control circuit or a Class 1 signaling circuit has a maximum voltage of 600 volts; however, the power output of the source need not be limited.

(b) Class 2 and Class 3 circuits.

(i) Power for Class 2 and Class 3 circuits is limited either inherently (in which no overcurrent protection is required) or by a combination of a power source and overcurrent protection.

(ii) The maximum circuit voltage is 150 volts AC or DC for a Class 2 inherently limited power source, and 100 volts AC or DC for a Class 3 inherently limited power source.

(iii) The maximum circuit voltage is 30 volts AC and 60 volts DC for a Class 2 power source limited by overcurrent protection, and 150 volts AC or DC for a Class 3 power source limited by overcurrent protection.

(c) The maximum circuit voltages in (a) and (b) of this subsection apply to sinusoidal AC or continuous DC power sources, and where wet contact is unlikely.

(2) A Class 2 or Class 3 power supply unit must be durably and visibly marked to indicate the class of supply and its electrical rating.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-37409, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-37412 What requirements apply to fire protective signaling systems? (1) Fire protective signaling circuits must be classified either as nonpower limited or power limited.

(2) The power sources for use with fire protective signaling circuits must be either power limited or nonlimited as follows:

(a) The power supply of nonpower-limited fire protective signaling circuits must have a maximum output voltage of 600 volts.

(b) The power for power-limited fire protective signaling circuits must be either inherently limited, in which no overcurrent protection is required, or limited by a combination of power source and overcurrent protection.

(3) Nonpower-limited fire protective signaling circuits and Class 1 circuits may occupy the same enclosure, cable, or raceway if all conductors are insulated for maximum voltage of any conductor within the enclosure, cable or raceway. Power supply and fire protective signaling circuit conductors are permitted in the same enclosure, cable, or raceway only if connected to the same equipment.

(4) Where open conductors are installed, power-limited fire protective signaling circuits must be separated at least 2 inches from conductors of any light, power, Class 1, and nonpower-limited fire protective signaling circuits unless using a special and equally protective method of conductor separation. Cables and conductors of two or more power-limited fire protective signaling circuits or Class 3 circuits are permitted in the same cable, enclosure, or raceway. Conductors of one or more Class 2 circuits are permitted within the same cable, enclosure, or raceway with conductors of power-limited fire protective signaling circuits if the insulation of Class 2 circuit conductors in the cable, enclosure, or raceway is at least that needed for the power-limited fire protective signaling circuits.

(5) Fire protective signaling circuits must be identified at terminal and junction locations in a manner that will prevent unintentional interference with the signaling circuit during testing and servicing. Power-limited fire protective signaling circuits must be visibly and durably marked at terminations.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-37412, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-376 Working on or near exposed energized parts.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-376, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-37603 What does this section cover? WAC 296-306A-376 applies to work performed on exposed live parts (involving either direct contact or contact by means of tools or materials) or near enough to them for employees to be exposed to any hazard they present.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-37603, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-37606 Who may work on energized parts? Only qualified persons may work on electric circuit parts of equipment that have not been deenergized under the procedures of WAC 296-306A-37807. Qualified persons must be capable of working safely on energized circuits and must be familiar with the proper use of special precautionary techniques, personal protective equipment, insulating and shielding materials, and insulated tools.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-37606, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-37609 What requirements apply to working near low voltage lines? When employees are working near energized electrical service conductors operating at 750 volts or less, employees must work in a manner to prevent contact with the energized conductors.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-37609, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-37612 What requirements apply to qualified persons working near overhead lines? When a qualified person is working near overhead lines, whether in an elevated position or on the ground, the person must not approach, or take any conductive object without an approved insulating handle, closer to exposed energized parts than shown in WAC 296-306A-150 unless:

(1) The person is insulated from the energized part (gloves, with sleeves if necessary, rated for the voltage involved are considered to be insulation of the person from the energized part on which work is performed); or

(2) The energized part is insulated both from all other conductive objects at a different potential and from the person; or

(3) The person is insulated from all conductive objects at a potential different from that of the energized part.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-37612, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-37615 What requirements apply to vehicles and mechanical equipment near overhead lines?

(1) Any vehicle or mechanical equipment that may have parts of its structure elevated near energized overhead lines must be operated so that a clearance of 10 ft. is maintained. If the voltage is higher than 50kV, the clearance must be increased 0.4 inch for every 1kV over the voltage. The clearance may be reduced only if:

(a) The vehicle is in transit with its structure lowered, the clearance may be reduced to 4 ft. If the voltage is higher than 50kV, the clearance must be increased 0.4 inch for every 1kV over that voltage.

(b) Insulating barriers are installed to prevent contact with the lines, and if the barriers are rated for the voltage of the line being guarded and are not a part of or an attachment to the vehicle or its raised structure, the clearance may be reduced to a distance within the designed working dimensions of the insulating barrier.

(2) If the equipment is an aerial lift insulated for the voltage involved, and if the work is performed by a qualified

person, the clearance (between the uninsulated portion of the aerial lift and the power line) may be reduced to the distance given in WAC 296-306A-150.

(3) Employees standing on the ground must not contact the vehicle or mechanical equipment or any of its attachments, unless:

(a) The employee is using protective equipment rated for the voltage; or

(b) The equipment is located so that no uninsulated part of its structure (that portion of the structure that provides a conductive path to employees on the ground) can come closer to the line than permitted in this section.

(4) If any vehicle or mechanical equipment that may have parts of its structure elevated near energized overhead lines is intentionally grounded, employees working on the ground near the point of grounding must not stand at the grounding location whenever there is a possibility of overhead line contact. Additional precautions, such as the use of barricades or insulation, must be taken to protect employees from hazardous ground potentials, depending on earth resistivity and fault currents, which can develop within the first few feet or more outward from the grounding point.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-37615, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-37618 What lighting must be provided for employees working near exposed energized parts? (1) Employees must not enter spaces containing exposed energized parts, unless lighting is provided that enables the employees to perform the work safely.

(2) Where lack of lighting or an obstruction prevents an employee from seeing the work to be performed, employees must not perform tasks near exposed energized parts. Employees shall not reach blindly into areas that may contain energized parts.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-37618, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-37621 What requirements apply to working near exposed energized parts in confined spaces?

(1) For working in a confined or enclosed space (such as a manhole or vault) that contains exposed energized parts, the employer shall provide, and the employee must use, protective shields, protective barriers, or insulating materials that are necessary to avoid contact with these parts. Doors, hinged panels, and the like must be secured to prevent swinging into an employee and causing the employee to contact exposed energized parts.

(2) Conductive materials and equipment that are in contact with any part of an employee's body shall be handled in a manner that will prevent them from contacting exposed energized conductors or circuit parts. If an employee handles long conductive objects (such as ducts and pipes) in areas with exposed live parts, you must institute work practices (such as the use of insulation, guarding, and material handling techniques) that will minimize the hazard.

(3) Portable ladders must have nonconductive siderails if they are used where the employee or the ladder could contact exposed energized parts.

(4) Conductive articles of jewelry and clothing shall not be worn if they might contact exposed energized parts.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-37621, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-37624 What housekeeping requirements apply to working near exposed energized parts?

(1) Where live parts present an electrical contact hazard, employees must not perform housekeeping duties near enough to the parts that there is a possibility of contact, unless adequate safeguards (such as insulating equipment or barriers) are provided.

(2) Electrically conductive cleaning materials (including conductive solids such as steel wool, metalized cloth, and silicon carbide, as well as conductive liquid solutions) must not be used in proximity to energized parts unless procedures are followed that will prevent electrical contact.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-37624, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-37627 Who may defeat an electrical safety interlock? Only a qualified person following the requirements of this section may defeat an electrical safety interlock, and then only temporarily while he or she is working on the equipment. The interlock system must be returned to its operable condition when this work is completed.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-37627, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-378 Safety-related work practices.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-378, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-37801 What does this section cover? (1) WAC 296-306A-376 and 296-306A-378 cover electrical safety-related work practices for both qualified persons (those who have training in avoiding the electrical hazards of working on or near exposed energized parts) and unqualified persons (those with little or no such training) working on, near, or with the following installations:

(a) Installations of electric conductors and equipment within or on buildings or other structures, and on other premises such as yards, parking, and other lots, and industrial substations;

(b) Installations of conductors that connect to the supply of electricity;

(c) Installations of other outside conductors on the premises; and

(d) Installations of optical fiber cable where such installations are made along with electric conductors.

(2) Chapter 306-376 WAC and WAC 296-306A-378 cover work performed by unqualified persons on, near, or with the installations listed in subsection (3) of this section.

(3) WAC 296-306A-376 and 296-306A-378 do not apply to work performed by qualified persons on or directly associated with the following installations:

(a) Installations for the generation, control, transformation, transmission, and distribution of electric energy (including communication and metering) located in buildings used for such purposes or located outdoors.

Work on or directly associated with generation, transmission, or distribution installations includes:

(i) Work performed directly on installations, such as repairing distribution lines or repairing a feed-water pump for the boiler in a generating plant.

(ii) Work directly associated with installations, such as line-clearance tree trimming and replacing utility poles.

(iii) Work on electric utilization circuits in a generating plant where:

- The circuits are combined with installations of power generation equipment or circuits; and

- The generation equipment or circuits present greater electrical hazards than those posed by the utilization equipment or circuits (such as exposure to higher voltages or lack of overcurrent protection).

(b) Installations in watercraft, railway rolling stock, aircraft, or automotive vehicles other than mobile homes and recreational vehicles.

(c) Installations of railways for generation, transformation, transmission, or distribution of power used exclusively for operation of rolling stock or installations of railways used exclusively for signaling and communication purposes.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-37801, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-37803 How must employees be trained on safety practices? (1) The training requirements in this section apply to employees who face a risk of electrical shock that is not reduced to a safe level by the electrical installation requirements of WAC 296-306A-362 through 296-306A-374.

(2) Training contents must include the following:

(a) Employees must be trained in and familiar with the safety-related work practices required by WAC 296-306A-376 through 296-306A-378 that apply to their job assignments.

(b) Employees who are covered by this section but who are not qualified persons must also be trained in and familiar with any electrically related safety practices that are not covered by this standard, but that are necessary for their safety.

(c) Qualified persons must, at a minimum, be trained in and familiar with the following:

(i) The skills and techniques necessary to distinguish exposed live parts from other parts of electric equipment;

(ii) The skills and techniques necessary to determine the nominal voltage of exposed live parts; and

(iii) The clearance distance specified in WAC 296-306A-376 and the corresponding voltages to which the qualified person will be exposed.

Note 1: For the purposes of WAC 296-306A-376 and 296-306A-378, an employee must have the training required for a qualified person in order to be considered a qualified person.

Note 2: Qualified persons whose work on energized equipment involves either direct contact or contact by means of tools or materials must also have the training needed to meet WAC 296-306A-376.

(3) You must provide either classroom or on-the-job training. The degree of training provided must be determined by the risk to the employee.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-37803, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-37805 How must safety-related work practices be chosen and used? Safety-related work practices must be used to prevent electric shock or other injuries resulting from either direct or indirect electrical contacts, when work is performed near or on equipment or circuits that are or may be energized. The specific safety-related work practices must be consistent with the nature and extent of the associated electrical hazards.

(1) When an employee may be exposed to live parts, they must be deenergized before the employee works on or near them, unless deenergizing introduces other hazards or is infeasible due to equipment design or operational limitations. Live parts that operate at less than 50 volts to ground need not be deenergized if there will be no increased exposure to electrical burns or to explosion due to electric arcs.

Note 1: Examples of other hazards include deactivation of emergency alarm systems, shutdown of hazardous location ventilation equipment, or removal of illumination for an area.

Note 2: An example of work that may be performed on or near energized circuit parts because of unfeasibility due to equipment design or operational limitations is testing of electric circuits that can only be performed with the circuit energized.

(2) If the exposed live parts are not deenergized (for reasons of increased or additional hazards or unfeasibility), other safety-related work practices must be used to protect employees who may be exposed to the electrical hazards involved. Such work practices must protect employees against contact with energized circuit parts directly with any part of their body or indirectly through some other conductive object. The work practices must be suitable for the voltage level of the exposed electric conductors or circuit parts.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-37805, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-37807 What work practices must be followed for work on exposed deenergized parts? (1) This section applies to work on exposed deenergized parts or near enough to them to expose the employee to any electrical hazard they present. Conductors and parts of electric equipment that have been deenergized but have not been locked out or tagged must be treated as energized parts, and WAC 296-306A-376 applies to work on or near them.

(2) While any employee is exposed to contact with parts of fixed electric equipment or circuits which have been deenergized, the circuits energizing the parts must be locked out or tagged or both according to the requirements of this section. The requirements must be followed in the order in which they are presented.

"Fixed equipment" means equipment that is fastened or connected by permanent wiring methods.

Note: Lockout and tagging procedures that comply with WAC 296-306A-320 will also be deemed to comply with WAC 296-306A-37807 through 296-306A-37817 if:

- The procedures address the electrical safety hazards covered by this part; and
- The procedures include the requirements of WAC 296-306A-37813(4) and 296-306A-37815(2).

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-37807, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-37809 Must an employer have a written copy of lockout-tagout procedures? The employer must maintain a written copy of the procedures outlined in WAC 296-306A-37807 through 296-306A-37817 and must make it available for inspection by us or by employees. The written procedures may be in the form of a copy of WAC 296-306A-37807 through 296-306A-37817.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-37809, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-37811 What work practices must be followed for deenergizing equipment? (1) Safe procedures for deenergizing circuits and equipment must be determined before circuits or equipment are deenergized.

(2) The circuits and equipment to be worked on must be disconnected from all electric energy sources. Control circuit devices, such as push buttons, selector switches, and interlocks, must not be used as the sole means for deenergizing circuits or equipment. Interlocks for electric equipment must not be used as a substitute for lockout and tagging procedures.

(3) Stored electric energy which might endanger employees must be released. Capacitors must be discharged and high capacitance elements must be short-circuited and grounded, if the stored electric energy might endanger employees.

Note: Capacitors or associated equipment handled in meeting this requirement must be treated as energized.

(4) Stored nonelectrical energy in devices that could reenergize electric circuit parts must be blocked or relieved to the extent that the circuit parts could not be accidentally energized by the device.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-37811, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-37813 How must locks and tags be applied? (1) A lock and a tag must be placed on each disconnecting means used to deenergize circuits and equipment on which work is to be performed, except as provided in subsections (3) and (5) of this section. The lock must be attached to prevent anyone from operating the disconnecting means unless they resort to undue force or the use of tools.

(2) Each tag must have a statement prohibiting unauthorized operation of the disconnecting means and removal of the tag.

(3) If a lock cannot be applied, or if tagging procedures will provide a level of safety equivalent to that obtained by the use of a lock, a tag may be used without a lock.

(4) A tag used without a lock must be supplemented by at least one additional safety measure that provides a level of safety equivalent to that obtained by the use of a lock. Examples of additional safety measures include the removal of an isolating circuit element, blocking of a controlling switch, or opening of an extra disconnecting device.

(5) A lock may be placed without a tag only under the following conditions:

(a) Only one circuit or piece of equipment is deenergized; and

(b) The lockout period does not extend beyond the work shifts; and

(c) Employees exposed to the hazards associated with reenergizing the circuit or equipment are familiar with this procedure.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-37813, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-37815 What work practices must be followed to verify deenergization? The requirements of this section must be met before any circuits or equipment can be considered and worked as deenergized.

(1) A qualified person must operate the equipment operating controls or otherwise verify that the equipment cannot be restarted.

(2) A qualified person must use test equipment to test the circuit elements and electrical parts of equipment to which employees will be exposed and shall verify that the circuit elements and equipment parts are deenergized. The test must also determine if any energized conditions exists as a result of inadvertently induced voltage or unrelated voltage backfeed even though specific parts of the circuit have been deenergized and presumed to be safe. If the circuit to be tested is over 600 volts, nominal, the test equipment must be checked for proper operation immediately before and immediately after this test.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-37815, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-37817 What work practices must be followed when reenergizing equipment? These requirements must be met, in the order given, before circuits or equipment are reenergized, even temporarily.

(1) A qualified person must conduct tests and visual inspections as necessary to verify that all tools, electrical jumpers, shorts, grounds, and other devices have been removed, so that the circuits and equipment can be safely energized.

(2) Employees exposed to the hazards associated with reenergizing the circuit or equipment must be warned to stay clear of circuits and equipment.

(3) Each lock and tag must be removed by the employee who applied it or under his or her direct supervision. However, if this employee is absent from the workplace, then the lock or tag must be removed by a qualified person designated to perform this task if:

(a) The employer ensures that the employee who applied the lock or tag is not available at the workplace; and

(b) The employer ensures that the employee is aware that the lock or tag has been removed before resuming work at that workplace.

(4) There shall be a visual determination that all employees are clear of the circuits and equipment.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-37817, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-37819 What safety-related work practices relate to portable electric equipment? This section applies to using cord-connected and plug-connected equipment, including flexible cord sets (extension cords).

(1) Portable equipment must be handled in a manner that will not cause damage. Flexible electric cords connected to equipment must not be used for raising or lowering the

equipment. Flexible cords must not be fastened with staples or otherwise hung in a way that could damage the outer jacket or insulation.

(2) Visual inspection requirements:

(a) Portable cord-connected and plug-connected equipment and flexible cord sets must be visually inspected before use on any shift for external defects (such as loose parts, deformed and missing pins, or damage to outer jackets or insulation) and for evidence of possible internal damage (such as pinched or crushed outer jacket). Cord-connected and plug-connected equipment and flexible cord sets that remain connected once they are in place and are not exposed to damage need not be visually inspected until they are relocated.

(b) If there is a defect or evidence of damage that might expose an employee to injury, the defective or damaged items must be removed from service, and no employee shall use it until repairs and tests necessary to render the equipment safe have been made.

(c) When an attachment plug is to be connected to a receptacle (including any on a cord set), the relationship of the plug and receptacle contacts must first be checked to ensure they are of proper mating configurations.

(3) Requirements for grounding-type equipment:

(a) A flexible cord used with grounding-type equipment must contain an equipment grounding conductor.

(b) Attachment plugs and receptacles must not be connected or altered in a manner that would prevent proper continuity of the equipment grounding conductor at the point where plugs are attached to receptacles. These devices must not be altered to allow the grounding pole of a plug to be inserted into slots intended for connection to the current-carrying conductors.

(c) Adapters that interrupt the continuity of the equipment grounding connection are prohibited.

(4) Portable electric equipment and flexible cords used in highly conductive work locations, or in locations where employees are likely to contact water or conductive liquids, must be approved for those locations.

(5) Connecting attachment plugs.

(a) Employees' hands must not be wet when plugging and unplugging flexible cords and cord-connected and plug-connected equipment, if energized equipment is involved.

(b) Energized plug and receptacle connections must be handled only with insulating protective equipment if the condition of the connection could provide a conducting path to the employee's hand. For example: If a cord connector is wet from being immersed in water.

(c) Locking-type connectors must be properly secured after connection.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-37819, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-37821 What safety-related work practices relate to electric power and lighting circuits?

(1) Load rated switches, circuit breakers, or other devices specifically designed as disconnecting means must be used for the opening, reversing, or closing of circuits under load conditions. Any cable connectors other than the load-break type, fuses, terminal lugs, and cable splice connections are prohibited for such purposes, except in an emergency.

(2) After a circuit is deenergized by a circuit protective device, the circuit must not be manually reenergized until it has been determined that the equipment and circuit can be safely energized. This repetitive manual reclosing of circuit breakers or reenergizing circuits through replaced fuses is prohibited.

Note: When it can be determined from the design of the circuit and the overcurrent devices involved that the automatic operation of a device was caused by an overload rather than a fault connection, no examination of the circuit or connected equipment is needed before the circuit is reenergized.

(3) Overcurrent protection of circuits and conductors must not be modified, even on a temporary basis, beyond that allowed by this part for the installation safety requirements for overcurrent protection.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-37821, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-37823 What safety-related work practices relate to test instruments and equipment? (1) Only qualified persons may perform testing work on electric circuits or equipment.

(2) Test instruments and equipment and all associated test leads, cables, power cords, probes, and connectors must be visually inspected for external defects and damage before the equipment is used. If there is a defect or evidence of damage that might expose an employee to injury, the defective or damaged item must be removed from service, and no employee may use it until necessary repairs and tests to render the equipment safe have been made.

(3) Test instruments and equipment and their accessories must be rated for the circuits and equipment to which they will be connected and must be designed for the environment in which they will be used.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-37823, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-37825 What safety-related work practices relate to flammable materials? Where flammable materials are present only occasionally, electric equipment capable of igniting them must not be used, unless measures are taken to prevent hazardous conditions from developing.

Such materials include, but are not limited to: flammable gases, vapors, or liquids; combustible dust; and ignitable fibers or flyings.

Note: Electrical installation requirements for locations where flammable materials are present on a regular basis are contained in WAC 296-306A-372.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-37825, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-380 Electrical protective equipment.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-380, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-38003 How must protective equipment be used? (1) Employees working in the areas where there are potential electrical hazards must have and use

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electrical protective equipment that is appropriate for the specific parts of the body to be protected and for the work to be performed.

(2) If the insulating capability of protective equipment may be subject to damage during use, the insulating material must be protected.

For example: An outer covering of leather is sometimes used to protect rubber insulating material.

(3) Employees must wear nonconductive head protection wherever there is a danger of head injury from electric shock or burns due to contact with exposed energized parts.

(4) Employees must wear protective equipment for the eyes or face wherever there is danger of injury to the eyes or face from electrical arcs or flashes or from flying objects resulting from electrical explosion.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-38003, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-38006 What requirements apply to general protective equipment and tools? (1) When working near exposed energized conductors or circuit parts, each employee must use insulated tools or handling equipment if the tools or handling equipment might make contact with such conductors or parts. If the insulating capability of insulated tools or handling equipment is subject to damage, the insulating material must be protected.

(2) Ropes and handlines used near exposed energized parts must be nonconductive.

(3) Protective shields, protective barriers, or insulating materials must be used to protect each employee from shock, burns, or other electrically related injuries while that employee is working near exposed energized parts that might be accidentally contacted or where dangerous electric heating or arcing might occur. When normally enclosed live parts are exposed for maintenance or repair, they must be guarded to protect unqualified persons from contact with the live parts.

(4) Altering techniques must be used to warn and protect employees from hazards that could cause injury due to electric shock, burns, or failure of electric equipment parts.

(5) Safety signs, safety symbols, or accident prevention tags must be used where necessary to warn employees about electrical hazards that may endanger them, as required by WAC 296-306A-330.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-38006, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-38009 What manufacturing and marking requirements apply to electrical protective devices? Insulating blankets, matting, covers, line hose, gloves, and sleeves made of rubber must meet the following manufacture and marking requirements:

(1) Blankets, gloves, and sleeves must be produced by a seamless process.

(2) Each item must be clearly marked as follows:

(a) All classified equipment must be marked with its class number.

(b) Nonzone-resistant equipment other than matting must be marked Type I.

(c) Ozone-resistant equipment other than matting must be marked Type II.

(d) Other relevant markings, such as the manufacturer's identification and the size of the equipment, may also be provided.

(3) Markings must be nonconducting and shall be applied so they do not impair the insulating qualities of the equipment.

(4) Markings on gloves must be on the cuff.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-38009, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-38012 What electrical requirements apply to electrical protective devices? Insulating blankets, matting, covers, line hose, gloves, and sleeves made of rubber must meet the following electrical requirements:

(1) Equipment must be capable of withstanding the a-c proof-test voltage specified in Table 1 or the d-c proof-test voltage specified in Table 2.

(a) The proof-test must reliably indicate that the equipment can withstand the voltage involved.

(b) The test voltage must be applied continuously for three minutes for equipment other than matting and must be applied continuously for one minute for matting.

(c) Gloves must also be capable of withstanding the a-c proof-test voltage specified in Table 1 after a sixteen-hour water soak.

(2) When the a-c proof-test is used on gloves, the 60 hertz proof-test current must not exceed the values specified in Table 1 at any time during the test period.

(a) If the a-c proof-test is made at a frequency other than 60 hertz, the permissible proof-test current must be computed from the direct ratio of the frequencies.

(b) For the test, gloves (right side out) must be filled with tap water and immersed in water to a depth that is in accordance with Table 3. Water must be added to or removed from the glove, as necessary, so that the water level is the same inside and outside the glove.

(c) After the sixteen-hour water soak, the 60 hertz proof-test current may exceed the values given in Table 1 by not more than 2 milliamperes.

(3) Equipment that has been subjected to a minimum breakdown voltage test must not be used for electrical protection.

(4) Material used for Type II insulating equipment must be capable of withstanding an ozone test, with no visible effects. The ozone test must reliably indicate that the material will resist ozone exposure in actual use. Any visible signs of ozone deterioration of the material, such as checking, cracking, breaks, or pitting, is evidence of failure to meet the requirements for ozone-resistant material.

Note: Rubber insulating equipment meeting the following national consensus standards is considered to be in compliance with WAC 296-306A-38009, 296-306A-38012, and 296-306A-38015:

- American Society for Testing and Materials (ASTM) D 120-87, Specification for Rubber Insulating Gloves.
- ASTM D 178-93, Specification for Rubber Insulating Matting.
- ASTM D 1048-93, Specification for Rubber Insulating Blankets.
- ASTM D 1049-93, Specification for Rubber Insulating Covers.
- ASTM D 1050-90, Specification for Rubber Insulating Line Hose.
- ASTM D 1051-87, Specification for Rubber Insulating Sleeves.

These standards contain specifications for conducting the tests required in this section.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-38012, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-38015 What workmanship and finish requirements apply to electrical protective devices? Insulating blankets, matting, covers, line hose, gloves, and sleeves made of rubber must meet the following workmanship and finish requirements:

(1) Equipment must be free of harmful physical irregularities that can be detected by the tests or inspections required in WAC 296-306A-38012.

(2) Surface irregularities that may be present on all rubber goods because of imperfections on forms or molds or because of inherent difficulties in the manufacturing process and that may appear as indentations, protuberances, or imbedded foreign material are acceptable if:

(a) The indentation or protuberance blends into a smooth slope when the material is stretched.

(b) Foreign material remains in place when the insulating material is folded and stretches with the insulating material surrounding it.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-38015, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-38018 How must electrical protective devices be maintained and used? (1) Electrical protective equipment must be maintained in a safe, reliable condition.

(2) The following specific requirements apply to insulating blankets, covers, line hose, gloves, and sleeves made of rubber:

(a) Maximum use voltages must meet the requirements in Table 4.

(b) Insulating equipment must be inspected for damage before each day's use and immediately following any incident that can reasonably be suspected of having caused damage. Insulating gloves must be given an air test, along with the inspection.

(c) Insulating equipment with any of the following defects must not be used:

(i) A hole, tear, puncture, or cut;

(ii) Ozone cutting or ozone checking (the cutting action produced by ozone on rubber under mechanical stress into a series of interlacing cracks);

(iii) An embedded foreign object;

(iv) Any of the following texture changes: Swelling, softening, hardening, or becoming sticky or inelastic;

(v) Any other defect that damages the insulating properties.

(d) Insulating equipment found to have other defects that might affect its insulating properties must be removed from service and returned for testing under (h) of this subsection.

(e) Insulating equipment must be cleaned as needed to remove foreign substances.

(f) Insulating equipment must be stored in such a location and in such a manner as to protect it from light, temperature extremes, excessive humidity, ozone, and other injurious substances and conditions.

(g) Protector gloves must be worn over insulating gloves.

(h) Electrical protective equipment must be subjected to periodic electrical tests. Test voltages and the maximum intervals between tests must be according to Table 4 and Table 5.

(i) The test method used must reliably indicate whether the insulating equipment can withstand the voltages involved.

Note: Standard electrical test methods considered as meeting this requirement are given in the following national consensus standards:

- American Society for Testing and Materials (ASTM) D 120-87, Specification for Rubber Insulating Gloves.
- ASTM D 1048-93, Specification for Rubber Insulating Blankets.
- ASTM D 1049-93, Specification for Rubber Insulating Covers.
- ASTM D 1050-90, Specification for Rubber Insulating Line Hose.
- ASTM D 1051-87, Specification for Rubber Insulating Sleeves.
- ASTM F 478-92, Specification for In-Service Care of Insulating Line Hose and Covers.
- ASTM F 479-88a, Specification for In-Service Care of Insulating Blankets.
- ASTM F 496-93b, Specification for In-Service Care of Insulating Gloves and Sleeves.

(j) Insulating equipment that fails inspections or electrical tests must not be used by employees, except as follows:

(i) Rubber insulating line hose could be used in shorter lengths with the defective portion cut off.

(ii) Rubber insulating blankets could be repaired using a compatible patch that results in physical and electrical properties equal to those of the blanket.

(iii) Rubber insulating blankets could be salvaged by severing the defective area from the undamaged portion of the blanket. The resulting undamaged area must not be smaller than twenty-two inches by twenty-two inches (560 mm by 560 mm) for Class 1, 2, 3, and 4 blankets.

(k) Repaired insulating equipment must be retested before it may be used by employees.

(l) You must certify that equipment has been tested in accordance with the requirements of (h), (i), and (k) of this subsection. The certification must identify the equipment that passed the test and the date it was tested.

Note: This requirement may be met by marking the equipment and entering the results of the tests and the dates of testing onto logs.

<i>Class of equipment</i>	<i>Proof-test voltage rms V</i>	<i>267 mm (10.5 in.) glove</i>	<i>356 mm (14 in.) glove</i>	<i>406 mm (16 in.) glove</i>	<i>457 mm (18 in.) glove</i>
0	5,000	8	12	14	16
1	10,000		14	16	18
2	20,000		16	18	20
3	30,000		18	20	22
4	40,000			22	24

<i>Class of equipment</i>	<i>Proof-test voltage</i>
0	20,000
1	40,000
2	50,000
3	60,000
4	70,000

Note: The d-c voltages listed in this table are not appropriate for proof testing rubber insulating line hose or covers. For this equipment, d-c proof-tests shall use a voltage high enough to indicate that the equipment can be safely used at the voltages listed in Table 3. See ASTM D 1050-90 and ASTM D 1049-88 for further information on proof tests for rubber insulating line hose and covers.

Table 3 Glove Tests-Water Level ^{1, 2}				
Class of glove	A-C proof-test		D-C proof-test	
	mm.	in.	mm.	in.
0	38	1.5	38	1.5
1	38	1.5	51	2.0
2	64	2.5	76	3.0
3	89	3.5	102	4.0
4	127	5.0	153	6.0

¹The water level is given as the clearance from the cuff of the glove to the water line, with a tolerance of 13 mm. (0.5 in.).
²If atmospheric conditions make the specified clearances impractical, the clearances may be increased by a maximum of 25 mm. (1 in.)

Table 4 Rubber Insulating Equipment Voltage Requirements			
Class of equipment	Maximum use voltage ¹ a-c-rms	Retest voltage ² a-c-rms	Retest voltage ² d-c-rms
0	1,000	5,000	20,000
1	7,500	10,000	40,000
2	17,000	20,000	50,000
3	26,500	30,000	60,000
4	36,000	40,000	70,000

Note: Rubber gloves shall only be used on voltages of 5000 volts phase to phase or less.
¹The maximum use voltage is the a-c voltage (rms) classification of the protective equipment that designates the maximum nominal design/voltage of the energized system that may be safely worked. The nominal design voltage is equal to the phase-to-phase voltage on multiphase circuits. However, the phase-to-ground potential is considered to be the nominal design/voltage:
 (a) If there is no multiphase exposure in a system area and if the voltage exposure is limited to the phase-to-ground potential, or
 (b) If the electrical equipment and devices are insulated or isolated or both so that the multiphase exposure on a grounded wye circuit is removed.
²The proof-test voltage shall be applied continuously for at least one minute, but no more than three minutes.

Table 5 Rubber Insulating Equipment Test Intervals	
Type of equipment	When to test
Rubber insulating line hose	Upon indication that insulating value is suspect
Rubber insulating covers	Upon indication that insulating value is suspect
Rubber insulating blankets	Before first issue and every 12 months thereafter
Rubber insulating gloves	Before first issue and every 6 months thereafter
Rubber insulating sleeves	Before first issue and every 12 months thereafter

(3) Where switches or fuses of more than 150 volts to ground are not guarded during ordinary operations, suitable insulating floors, mats or platforms must be provided on

which the operator must stand while handling the switches.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-38018, filed 10/31/96, effective 12/1/96.]

SPECIALIZED OPERATIONS

Part U-1

Hazardous Materials—Anhydrous Ammonia

WAC 296-306A-400 Anhydrous ammonia.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-400, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-40001 What does this section cover? WAC 296-306A-400 covers the transportation and application of anhydrous ammonia.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-40001, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-40003 What definitions apply to this section? "Certified" means the equipment has been tested by a nationally recognized testing laboratory and meets nationally recognized standards or is safe for a specific use; or is a kind whose production is periodically inspected by a nationally recognized testing laboratory, and bears identification of certification.

"DOT" means the Federal Department of Transportation.

"DOT container" means a container constructed according to the requirements of 49 CFR chapter 1.

"DOT cylinder" means a cylinder that meets the requirements of 49 CFR chapter 1.

"Labeled" means the equipment has an attached label, symbol, or other identifying mark of a nationally recognized testing laboratory that makes periodic inspections of the production of such equipment, and the label indicates compliance with nationally recognized standards or tests.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-40003, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-40005 What general requirements apply to the storage and handling of anhydrous ammonia? (1) All employees must use gloves and goggles and/or a face shield while working on or with charged anhydrous ammonia equipment.

(2) You must ensure that equipment is inspected before each day's work. Conditions that would contribute to leaks shall be corrected.

(3) Hose end-valves must be closed when not in use to prevent accidental discharge in case the main valve is opened.

(4) Relief and vapor valves must discharge away from the operator's working position.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-40005, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-40007 What requirements apply to systems mounted on farm wagons (implements of husbandry) for the transportation of ammonia? All anhydrous ammonia containers with a capacity of 3,000 gallons or less and equipment mounted on farm wagons (implements of husbandry) that is used to transport ammonia must meet the requirements of this section.

WAC 296-306A-40011 through 296-306A-40037 also apply unless otherwise noted.

(1) Containers must meet the following mounting requirements:

(a) The farm wagon or container has a stop so the container does not dislodge from its mounting when a farm wagon stops suddenly.

(b) The container is anchored to the farm wagon at one or more places on each side of the container.

(c) The weight of containers mounted on four-wheel farm wagons, is distributed evenly over both axles.

(d) When the cradle and the container are not welded together, material between them eliminates metal-to-metal friction.

(2) Container accessories must meet the following requirements:

(a) Each container has a fixed maximum liquid-level gauge.

(b) All containers with more than 250-gallon capacity have a pressure gauge with a dial graduated from 0-400 psi.

(c) The filling connection is fitted with one of the following:

(i) A combination back-pressure check valve and excess-flow valve; or

(ii) One double or two single back-pressure check valves; or

(iii) A positive shut-off valve that has either an internal back-pressure check valve or an internal excess flow valve.

(d) All containers with more than 250-gallon capacity are equipped for spray loading or with an approved vapor return valve.

(e) All vapor and liquid connections have approved excess flow valves or quick-closing internal valves that are only open for operating.

Exception: Safety-relief valves and connections that are specifically exempted by WAC 296-306A-40019(5) are exempt from this requirement.

(f) Fittings are protected from physical damage by a rigid guard. The guard is designed to withstand force from any direction, equal to twice the weight of the container and lading, at a safety factor of four. If the guard is fully enclosed, the safety-relief valves are properly vented through the guard.

(g) If a liquid withdrawal line is installed in the bottom of a container, the connections and hose are at least as high as the lowest horizontal edge of the farm wagon axle.

(h) Both ends of the hose are secure while in transit.

(3) Each side and the rear end of the container must be marked in letters at least four inches high, with the words "ANHYDROUS AMMONIA" or, "CAUTION—AMMONIA," or marked according to DOT regulations.

(4) Farm wagons (implements of husbandry) must meet all state regulations and the following requirements:

(a) All farm wagons must be securely attached to the vehicle drawing them by drawbars with safety chains.

(b) A farm wagon must be constructed so that it will follow the path of the towing vehicle and will prevent the towed wagon from whipping or swerving dangerously from side to side.

(c) All farm wagons must have five gallons or more of readily available clean water.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-40007, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-40009 What requirements apply to systems mounted on farm wagons (implements of husbandry) for the application of ammonia? This section applies to systems mounted on farm equipment that are used for the field application of ammonia.

WAC 296-306A-40011 through 296-306A-40037 also apply unless otherwise noted.

(1) All containers must be securely mounted.

(2) Container valves and accessories must meet the following requirements:

(a) Each container has a fixed maximum liquid-level gauge.

(b) The filling connection is fitted with one of the following:

(i) A combination back-pressure check valve and excess-flow valve; or

(ii) One double or two single back-pressure check valves; or

(iii) A positive shut-off valve that has either an internal back-pressure check valve or an internal excess flow valve.

(c) An excess-flow valve is not required in the vapor connection if the controlling orifice is a maximum of 7/16 inch in diameter and the valve is a hand-operated shut-off valve. To assist in filling applicator tanks, you may bleed vapors to the open air, if this requirement is met.

(d) Metering devices may be connected directly to the tank withdrawal valve. You may use a union type connection between the tank valve and metering device. You may use remote mounting of metering devices if the hose meets the requirements of Appendix B. When the applicator tank is trailed and the metering device is remotely mounted, such as on the tractor tool bar, you must use an automatic break-away type, self-closing coupling.

(e) No excess-flow valve is required in the liquid withdrawal line if the controlling orifice between the contents of the container and the outlet of the shut-off valve is a maximum of 7/16 inch in diameter.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-40009, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-40011 What requirements must approved anhydrous ammonia equipment meet? All equipment must be approved by one of the following methods:

(1) The equipment was installed before February 8, 1973, and was approved and tested, and installed according to either the requirements of the American National Standard for the Storage and Handling of Anhydrous Ammonia, K61.1, or the Fertilizer Institute Standards for the Storage and Handling of Agricultural Anhydrous Ammonia, M-1, in effect at the time of installation; or

(2) The equipment is accepted, or certified, or listed, or labeled, or otherwise determined to be safe by a nationally recognized testing laboratory; or

(3)(a) The equipment is a type that no nationally recognized testing laboratory accepts, certifies, lists, labels, or determines to be safe; and

(b) The equipment is inspected or tested by an authority responsible for enforcing occupational safety provisions of a law, code, or regulation pertaining to the storage, handling, transport, and use of anhydrous ammonia; and

(c) The equipment is found in compliance with either the requirements of the American National Standard for the Storage and Handling of Anhydrous Ammonia, K61.1, or the Fertilizer Institute Standards for the Storage and Handling of Agricultural Anhydrous Ammonia, M-1, in effect at the time of installation; or

(4) For a custom-designed and custom-built unit:

(a) You cannot find a nationally recognized testing laboratory or authority responsible for the enforcement of a law, code or regulation pertaining to the storage, transportation and use of anhydrous ammonia that is willing to accept, certify, list, label or determine to be safe your custom equipment; and

(b) You have on file a document attesting to its safe condition following appropriate tests. The document must be signed by a registered professional engineer or qualified person. The document must describe the test bases, test data and results, and also the qualifications of the certifying person.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-40011, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-40013 What requirements apply to the construction, original test, and requalification of nonrefrigerated containers? The code is the Unfired Pressure Vessel Code of the American Society of Mechanical Engineers (Section VIII of the ASME Boiler Construction Code), 1952, 1956, 1959, 1962, 1965, 1968 and 1971 editions, the joint code of the American Petroleum Institute and the American Society of Mechanical Engineers (API-ASME Code) 1951 edition, and amendments or later editions, as adopted.

(1) Containers used with systems covered in WAC 296-306A-40005 and 296-306A-40007 must be constructed and tested according to the code.

Exception: Construction under Table UW-12 at a basic joint efficiency of under 80% is prohibited. Containers built according to code are exempt from paragraphs UG-125 to UG-128, inclusive, and paragraphs UG-132 and UG-133 of the code.

Note: This subsection allows the continued use or reinstallation of containers constructed and maintained according to the 1949, 1950, 1952, 1956, 1959, 1962, 1965 and 1968 editions of the Unfired Pressure Vessel Code of the ASME or any revisions thereof in effect at the time of fabrication.

(2) Containers more than 36 inches in diameter or 250 gallons water capacity must be constructed to meet one or more of the following requirements:

(a) Containers must be stress relieved after fabrication according to the code; or

(b) Cold-formed heads, when used, must be stress relieved; or

(c) Hot-formed heads must be used.

(3) Welding to the shell, head, or any other part of the container subject to internal pressure must be according to the code. Other welding is permitted only on saddle plates, lugs, or brackets attached to the container by the container manufacturer.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-40013, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-40015 How must nonrefrigerated containers and systems (other than DOT containers) be marked? (1) System nameplates, when required, must be permanently attached to the system so they are readily accessible for inspection.

(2) Each container or system covered in WAC 296-306A-40005 and 296-306A-40007 must be marked as follows:

(a) With indication that the container or system meets the requirements of the code under which the container is constructed.

(b) With indication on the container and system nameplate when the system is designed for underground installation.

(c) With the name and address of the supplier of the container or the trade name of the container and with the date of fabrication.

(d) With the water capacity of the container in pounds at 60°F or gallons, United States standard.

(e) With the design pressure in pounds per square inch gauge.

(f) With the wall thickness of the shell and heads.

(g) With indication of the maximum fill level for liquid anhydrous ammonia between 20°F and 100°F. Markings must be in increments of not more than 20°F.

Exception: Containers with fixed maximum level indicators, such as fixed length dip tubes, or containers that are filled by weight are exempt from this requirement.

(h) With the outside surface area in square feet.

(i) With minimum temperature in Fahrenheit for which the container is designed.

(j) The marking must be on the container itself or on a permanently attached nameplate.

(3) All main operating valves on permanently installed containers with a capacity of over 3,000 water gallons must be identified to show whether the valve is in liquid or vapor service. The valve must be identified as follows:

(a) The word LIQUID (or LIQUID VALVE), VAPOR (or VAPOR VALVE), as appropriate, must be placed on or within twelve inches of the valve by means of a stencil tag or decal.

(b) Liquid valves must be painted orange and vapor valves must be painted yellow. The legend ORANGE-LIQUID, YELLOW-VAPOR must be displayed in one or more conspicuous places at each permanent storage location. The legend must have letters at least two inches high and must be placed against a contrasting background.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-40015, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-40017 Where may anhydrous ammonia containers be located? (1) When selecting the location for a storage container, you must take into account the physiological effects of ammonia and adjacent fire hazards. Containers located indoors must be in areas especially approved for container storage.

(2) Containers must be located at least fifty feet from a dug well or other sources of potable water supply, unless the container is a part of a water treatment installation.

(3) Permanent storage containers must be located outside densely populated areas.

(4) Containers must be located according to the following:

Minimum distances (feet) from container to:

Nominal capacity of container	Line of adjoining property that may be built upon, highways & main line of railroad	Place of public assembly	Institution occupancy
Over 500 to 2,000	25	150	250
Over 2,000 to 30,000	50	300	500
Over 30,000 to 100,000	50	450	750
Over 100,000	50	600	1,000

(5) Storage areas must be kept free of readily ignitable materials such as waste, weeds and long dry grass.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-40017, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-40019 What requirements apply to container accessories? (1) All accessories must be designed for at least the maximum working pressure of the part of the system on which they are installed. All accessories must be fabricated from materials suitable for anhydrous ammonia service.

(2) All connections to containers must have shut-off valves located as close to the container as practical.

Exception: Safety-relief devices, gauging devices, or those fitted with a No. 54 drill size orifice are exempt from this requirement.

(3) All required excess flow valves must close automatically at the rated flows of vapor or liquid specified by the manufacturer. The connections, lines, valves, and fittings must have a greater capacity than the rated flow of the excess flow valve.

(4) Liquid-level gauging devices that require bleeding to the atmosphere and that are constructed so that outward flow is a maximum of that passed by a No. 54 drill size opening may be installed without excess flow valves.

(5) Openings from the container or through fittings attached directly on container to which pressure gauge connections are made may be installed without excess flow valves if the openings are a maximum of No. 54 drill size.

(6) Required excess flow and back pressure check valves must be located inside the container or outside as close as practical to where the line enters the container. When located outside, the installation must be made to prevent any stress beyond the excess flow or back pressure check valve from causing a break between the container and the valve.

(7) Excess flow valves must be designed with a bypass that is a maximum of No. 60 drill size opening to allow equalization of pressures.

(8) Shut-off valves provided with an excess flow valve must be designed for proper installation in a container connection so that the excess flow valve will close if the shut-off valve breaks.

(9) All excess flow valves must be plainly and permanently marked with the name or trademark of the manufacturer, the catalog number, and the rated capacity.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-40019, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-40021 What requirements apply to piping, tubing, and fittings? (1) All piping, tubing and fittings must be made of material suitable for anhydrous ammonia service.

(2) All piping, tubing and fittings must be designed for a pressure of at least the maximum pressure to which they may be subjected in service.

(3) All piping must be well supported and allow for expansion and contraction. All refrigeration system piping must conform to the Refrigeration Piping Code (ANSI B31.5 1966 addenda B31.1a-1968), a section of the American Standard Code for Pressure Piping, as it applies to ammonia.

(4) Piping used on nonrefrigerated systems must meet the requirements of ASTM A-53-1969 Grade B Electric Resistance Welded and Electric Flash Welded Pipe. Pipe must be at least Schedule 40 when joints are welded, or welded and flanged. Pipe must be at least Schedule 80 when joints are threaded. Brass, copper, or galvanized steel pipe or tubing is prohibited.

(5) All metal flexible connections for permanent installations must have a minimum working pressure of 250 psig (safety factor of 4). For temporary installations, you may use hose that meets the requirements of WAC 296-306A-40023.

(6) Cast iron fittings are prohibited. You must use fittings made especially for ammonia service of malleable or nodular iron that meet the requirements of Specification ASTM A47 or ASTM A395.

(7) All piping, tubing, and fittings must allow for expansion, contraction, jarring, vibration, and settling.

(8) You must make adequate provision to protect all exposed piping from physical damage from moving machinery, the presence of automobiles or trucks, or other strain on the piping.

(9) Joint compounds must be resistant to ammonia.

(10) After assembly, all piping and tubing must be tested and proved to be free from leaks at pressure that is at least equal to the normal operating pressure of the system.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-40021, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-40023 What specifications must hoses meet? (1) Hose used in ammonia service and subject to container pressure must meet the requirements of the joint Rubber Manufacturers Association and the Fertilizer Institute "Hose Specifications for Anhydrous Ammonia."

(2) Hose subject to container pressure must be designed for a minimum working pressure of 350 psig and a minimum

burst pressure of 1750 psig. Hose assemblies must be able to withstand a test pressure of 500 psig.

(3) Hose and hose connections on the low pressure side of flow control or pressure reducing valves on devices discharging to atmospheric pressure must be designed for the maximum low side working pressure. All connections must be designed, constructed, and installed to prevent leaks when connected.

(4) Where liquid transfer hose is not drained after transfer operations, the hose must have an approved shut-off valve at the discharge end. You must provide a method to prevent excessive hydrostatic pressure in the hose. (See WAC 296-306A-40025.)

(5) On all hose 1/2-inch outside diameter and larger, used for the transfer of anhydrous ammonia liquid or vapor, you must ensure that the following information is etched, cast, or impressed at five-foot intervals:

- Anhydrous Ammonia
- xxx psig (Maximum working pressure)
- Manufacturer's Name or Trademark
- Year of Manufacture

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-40023, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-40025 What requirements apply to safety-relief devices? (1) Every container used in systems covered by WAC 296-306A-400 must have one or more spring-loaded safety-relief valves or the equivalent.

(2) The discharge from safety-relief valves must be vented away from the container, upward, and unobstructed to the atmosphere. All safety-relief valve discharge openings must have suitable raincaps that allow free discharge of the vapor and prevent water from entering. You must provide a method to drain condensate. The rate of discharge must be as follows:

Surface Area sq. ft.	Flow Rate CFM Air	Surface Area sq. ft.	Flow Rate CFM Air	Surface Area sq. ft.	Flow Rate CFM Air
20	258	185	1,600	900	5,850
25	310	190	1,640	950	6,120
30	360	195	1,670	1,000	6,380
35	408	200	1,710	1,050	6,640
40	455	210	1,780	1,100	6,900
45	501	220	1,850	1,150	7,160
50	547	230	1,920	1,200	7,410
55	591	240	1,980	1,250	7,660
60	635	250	2,050	1,300	7,910
65	678	260	2,120	1,350	8,160
70	720	270	2,180	1,400	8,410
75	762	280	2,250	1,450	8,650
80	804	290	2,320	1,500	8,900
85	845	300	2,380	1,550	9,140
90	885	310	2,450	1,600	9,380
95	925	320	2,510	1,650	9,620
100	965	330	2,570	1,700	9,860
105	1,010	340	2,640	1,750	10,090
110	1,050	350	2,700	1,800	10,330
115	1,090	360	2,760	1,850	10,560
120	1,120	370	2,830	1,900	10,800
125	1,160	380	2,890	1,950	11,030
130	1,200	390	2,950	2,000	11,260

135	1,240	400	3,010	2,050	11,490
140	1,280	450	3,320	2,100	11,720
145	1,310	500	3,620	2,150	11,950
150	1,350	550	3,910	2,200	12,180
155	1,390	600	4,200	2,250	12,400
160	1,420	650	4,480	2,300	12,630
165	1,460	700	4,760	2,350	12,850
170	1,500	750	5,040	2,400	13,080
175	1,530	800	5,300	2,450	13,300
180	1,570	850	5,590	2,500	13,520

- Exception example 1: A three-way valve installed under two safety-relief valves, each of which has the required rate of discharge and is installed to allow either of the safety-relief valves to be closed off, but does not allow both safety valves to be closed off at the same time.
- Exception example 2: Two separate relief valves are installed with individual shut-off valves. The two shut-off valve stems must be mechanically interconnected to allow the full required flow of one safety-relief valve at all times.
- Exception example 3: A safety-relief valve manifold that allows one valve of two, three, four or more to be closed off and the remaining valve or valves will provide not less than the rate of discharge shown on the manifold name-plate.

Surface area = total outside surface area of container in square feet. When the surface area is not stamped on the name plate or when the marking is not legible, calculate the area with one of the following formulas:

- Hemispherical heads: Area = (Length in feet) X (outside diameter in feet) X 3.1416.
- Other than hemispherical heads: Area = (Length in feet) + (0.3 outside diameter in feet) X (outside diameter in feet) X 3.1416.
- Spherical container: Area = (outside diameter in feet)² X 3.1416.
- Flow rate: CFM air = cubic feet per minute of air required at standard conditions, 60F and atmospheric pressure (14.7 psia).

For containers with total outside surface area greater than 2,500 sq. ft., the formula is: Flow rate CFM air = 22.11 A0.82 where A = outside surface area of the container in square feet.

(3) Container safety-relief valves must be set for start to discharge as follows, according to the design pressure of the container.

Containers	Minimum	Maximum*
ASME U-68, U-69	110%	125%
ASME U-200, U-201	95%	100%
ASME 1952, 1956, 1959, 1962, 1965, 1968 or 1971	95%	100%
API-ASME	95%	100%
U.S. Coast Guard	As required by USCG regulations	
DOT	As required by DOT regulations	

*Note: Plus a relief valve manufacturer's tolerance of ten percent.

(4) Safety-relief devices used in systems covered by WAC 296-306A-400 must be constructed to discharge at a rate equal to or greater than the rates required in subsection (2) of this section before the pressure exceeds 120% (not including the tolerance referred to in subsection (3) of this section) of the maximum permitted start-to-discharge pressure setting of the device.

(5) Safety-relief valves must be arranged to minimize tampering. If the pressure setting adjustment is external, the relief valves must have a sealable adjustment.

(6) Shut-off valves installed between the safety-relief valves and the containers or systems described in WAC 296-306A-400 are prohibited.

Exception: A shut-off valve may be used where the arrangement of the valve allows the required capacity flow through the relief valves.

(7) Safety-relief valves must have direct communication with the vapor space of the container.

(8) Each safety-relief valve used with systems described in WAC 296-306A-400 must be plainly and permanently marked as follows:

- (a) With the letters "AA" or the symbol NH3.
- (b) The pressure in pounds per square inch gauge (psig) at which the valve is set to start to discharge.
- (c) The rate of discharge of the valve in cubic feet per minute of air at 60°F and atmospheric pressure (14.7 psia).
- (d) The manufacturer's name and catalog number.

For example: A safety-relief valve marked AA-250-4200 (air) mean the valve is suitable for use on an anhydrous ammonia container; that it is set to start to discharge at 250 psig; and that its rate of discharge is 4,200 cubic feet per minute of air.

(9) No connection to the safety-relief valve may restrict the flow capacity on either the upstream or downstream side.

(10) The manufacturer or supplier of a safety-relief valve manifold must publish complete data showing the flow rating through the combined assembly of the manifold with safety-relief valves installed. The manifold flow rating must be determined by testing the manifold with all but one valve discharging. The flow rate must be determined by the restricted opening or openings or those having the lowest flow. The valve must be marked as required in subsection (7) of this section.

(11) A hydrostatic relief valve must be installed between each pair of valves in the liquid ammonia piping or hose where liquid may be trapped to release into the atmosphere at a safe location.

(12) Discharge from safety-relief devices must not terminate in or beneath any building.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-40025, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-40027 What emergency precautions are required when handling anhydrous ammonia? (1) You must train employees required to handle ammonia in the safe operating practices and the proper action to take in an emergency. Employees must be instructed to use the equipment listed in subsection (3) of this section in an emergency.

(2) If ammonia system leaks, the employees trained for and designated to act in emergencies must:

- (a) See that anyone not required to deal with an emergency is evacuated from the contaminated area.
- (b) Put on a suitable gas mask.

(c) Wear gauntlet type plastic or rubber gloves and wear plastic or rubber suits in heavily contaminated atmospheres.

(d) Shut off the appropriate valves.

(3) All storage systems must have on hand at least the following equipment for emergency and rescue purposes:

(a) *One full face gas mask with anhydrous ammonia refill canisters.

(b) **One pair of protective gloves.

(c) **One pair of protective boots.

(d) **One protective slicker and/or protective pants and jacket.

(e) Easily accessible shower and/or at least 50 gallons of clean water in an open top container.

(f) Tight-fitting vented goggles or one full face shield.

*An ammonia canister is effective for short periods of time in light concentrations of ammonia vapor, generally fifteen minutes in concentrations of 3% and will not protect breathing in heavier concentrations. If ammonia vapors are detected when mask is applied, the concentration is too high for safety. The life of a canister in service is controlled by the percentage of vapors to which it is exposed. Canisters must not be opened until ready for use and should be discarded after use. Unopened canisters may be guaranteed for as long as three years and all should be dated when received. In addition, an independently supplied air mask of the type used by fire departments may be used for severe emergencies.

**Gloves, boots, slickers, jackets, and pants must be made of rubber or other material impervious to ammonia.

(4) Where several persons are usually present, additional safety equipment may be necessary.

(5) Each tank motor vehicle transporting anhydrous ammonia, except farm applicator vehicles, must carry a container of at least five gallons of water and must have a full face gas mask, a pair of tight-fitting goggles or one full face shield. The driver must be instructed in their use and the proper action to take to provide for the driver's safety.

(6) If a leak occurs in transportation equipment and it is impractical to stop the leak, the driver should move the vehicle to an isolated location.

(7) If liquid ammonia contacts the skin or eyes, the affected area should be promptly and thoroughly flushed with water. Do not use neutralizing solutions or ointments on affected areas. A physician must treat all cases of eye exposure to liquid ammonia.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-40027, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-40029 What requirements apply to filling densities? Filling density means the percent ratio of the weight of the gas in a container to the weight of water at 60°F that the container will hold. One pound of water equals 27.737 cubic inches at 60°F. To determine the weight capacity of the tank in pounds, the weight of a gallon (231 cubic inches) of water at 60°F in air must be 8.32828 pounds.

(1) The filling densities for nonrefrigerated containers must not exceed the following:

	Aboveground	Underground
(i) Uninsulated	56%	58%
(ii) Insulated	57%	
(iii) DOT containers shall be filled according to DOT regulations.		

This corresponds to 82% by volume at -28°F, 85% by volume at 5°F, 87.5% by volume at 30°F, and 90.6% by volume at 60°F.

(2) When containers are filled according to liquid level by any gauging method other than a fixed length dip tube gauge, each container should have a thermometer well so that the internal liquid temperature can be easily determined and the amount of liquid and vapor in the container corrected to a 60°F basis.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-40029, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-40031 What requirements apply to the transfer of liquids? (1) Anhydrous ammonia must always be at a temperature suitable for the material of construction and design of the receiving containers. Ordinary steels are not suitable for refrigerated ammonia. See Appendix R of API Standard 620 "Recommended Rules for Design and Construction of Large Welded Low-Pressure Storage Tanks" for materials for low temperature service.

(2) At least one attendant must supervise the transfer of liquids from the time the connections are first made until they are finally disconnected.

(3) Flammable gases or gases that will react with ammonia (such as air) must not be used to unload tank cars or transport trucks.

(4) Containers must be charged or used only on authorization of the owner.

(5) Containers must be gauged and charged only in the open atmosphere or in buildings approved for that purpose.

(6) Pumps used for transferring ammonia must be recommended and labeled for ammonia service by the manufacturer.

(a) Pumps must be designed for at least 250 psig working pressure.

(b) Positive displacement pumps must have installed, off the discharge port, a constant differential relief valve discharging into the suction port of the pump through a line large enough to carry the full capacity of the pump at relief valve setting. The setting and installation must be according to the pump manufacturer's recommendations.

(c) On the discharge side of the pump, before the relief valve line, there must be a pressure gauge graduated from 0 to 400 psig installed.

(d) Plant piping must contain shut-off valves located as close as practical to pump connections.

(7) Compressors used for transferring or refrigerating ammonia must be recommended and labeled for ammonia service by the manufacturer.

(a) Compressors, except those used for refrigeration, must be designed for at least 250 psig working pressure. Crank cases of compressors not designed to withstand system pressure must be protected with a suitable safety-relief valve.

(b) Plant piping must have shut-off valves located as close as practical to compressor connections.

(c) A safety-relief valve large enough to discharge the full capacity of the compressor must be connected to the discharge before any shut-off valve.

(d) Compressors must have pressure gauges at suction and discharge graduated to at least one and one-half times the maximum pressure that can develop.

(e) Adequate means, such as drainable liquid trap, must be provided on the compressor suction to minimize the entry of liquid into the compressor.

(f) Where necessary to prevent contamination, an oil separator must be provided on the discharge side of the compressor.

(8) Loading and unloading systems must be protected by suitable devices to prevent emptying of the storage container or the container being loaded or unloaded if the hose is cut. Backflow check valves or properly sized excess flow valves must be installed where necessary to provide this protection. In the event that valves are not practical, remotely operated shut-off valves may be installed.

(9) Meters used to measure liquid anhydrous ammonia must be recommended and labeled for ammonia service by the manufacturer.

(a) Liquid meters must be designed for a minimum working pressure of 250 psig.

(b) The metering system must incorporate devices that will prevent the inadvertent measurement of vapor.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-40031, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-40033 What requirements apply to tank car unloading points and operations? (1) Provisions for unloading tank cars must meet DOT requirements.

(2) Unloading operations must be performed by reliable employees who are properly instructed and responsible for careful compliance with all procedures.

(3) Caution signs must be placed on the track or car to give necessary warning to anyone approaching car from the open end of the siding. The signs must be left up until after car is unloaded and disconnected from discharge connections. Signs must be of metal or other suitable material, at least 12 by 15 inches, and bear the words "STOP—Tank car connected" or "STOP—Men at work." The word "STOP" must be in letters at least four inches high and the other words in letters at least two inches high. The letters must be white on a blue background.

(4) The track of a tank car siding must be substantially level.

(5) Brakes must be set and wheels blocked on all cars being unloaded.

(6) Tank cars of anhydrous ammonia must be unloaded only at approved locations meeting the requirements of WAC 296-306A-40025(4) and 296-306A-40031(8).

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-40033, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-40035 What requirements apply to the liquid-level gauging device? (1) Each container except those filled by weight must have an approved liquid-level gauging device.

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(2) All gauging devices must be arranged so that the maximum liquid level to which the container is filled is easily determined.

(3) Gauging devices that require bleeding of the product to the atmosphere such as the rotary tube, fixed tube, and slip tube devices, must be designed so that the maximum opening of the bleed valve is a maximum of No. 54 drill size unless provided with an excess flow valve.

(4) Gauging devices must have a design pressure equal to or greater than the design pressure of the container on which they are installed.

(5) Fixed liquid-level gauges must be designed so that the maximum volume of the container filled by liquid is a maximum of 85% of its water capacity. The coupling into which the fixed liquid-level gauge is threaded must be placed at the 85% level of the container. If located elsewhere, the dip tube of this gauge must be installed so that it cannot be readily removed.

Note: This does not apply to refrigerated storage.

(6) Columnar gauge glasses must be restricted to stationary storage installation. They must have shut-off valves having metallic hand wheels, excess flow valves, and extra heavy glass adequately protected by a metal housing applied by the gauge manufacturer. They must be shielded against the direct rays of the sun.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-40035, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-40037 How should aboveground uninsulated containers be maintained? Aboveground uninsulated containers should have a reflective surface maintained in good condition. We recommend white for painted surfaces, but other light reflecting colors are acceptable.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-40037, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-40039 What requirements apply to electrical equipment and wiring? (1) Electrical equipment and wiring for use in ammonia installations must be general purpose or weather resistant as appropriate.

(2) Where concentrations of ammonia in the air in excess of 16% by volume are likely to be encountered, electrical equipment and wiring must be specified by and installed according to chapter 296-306A WAC Part T, for Class I, Group D locations.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-40039, filed 10/31/96, effective 12/1/96.]

Part U-2

Hazardous Materials—Liquefied Petroleum Gas

WAC 296-306A-410 Storage and handling of liquefied petroleum gases.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-410, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-41001 What does this part cover? Chapter 296-306A WAC Part U2 covers the storage and handling of liquefied petroleum gases.

The requirements of WAC 296-306A-410 apply to all LP-gas installations covered by this part.

For additional requirements related to: See WAC:

Cylinder systems	296-306A-415
Systems using non-DOT containers	296-306A-420
LP-gas as a motor fuel	296-306A-425
Storage of containers awaiting use or resale	296-306A-430
LP-gas installations on commercial vehicles	296-306A-435
LP-gas service stations	296-306A-440

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-41001, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-41003 Which LP-gas installations are not covered by this part? (1) This part does not apply to:

- (a) LP-gas refrigerated storage systems;
- (b) LP-gas used with oxygen;
- (c) LP-gas used in utility gas plants (covered by the National Fire Protection Association Standard for the Storage and Handling of Liquefied Petroleum Gases at Utility Gas Plants, NFPA No. 59-1968);

(d) Low-pressure (less than 1/2 pound per square inch or 14 inches water column) LP-gas piping systems, and the installation and operation of residential and commercial appliances supplied through such systems. The National Fire Protection Association Standard for the Installation of Gas Appliances and Gas Piping, NFPA 54-1969 apply to these systems.

(2) LP-gas installations, equipment, and appliances that met the requirements of the National Fire Protection Association Standard for the Storage and Handling of Liquefied Petroleum Gases NFPA No. 58-1972, 1973 at the time of manufacture or installation may be used if they do not create a hazard to employees.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-41003, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-41005 What definitions apply to this part? "Adequate ventilation," for fire prevention during normal operation, means the concentration of the gas in a gas-air mixture does not exceed 25% of the lower flammable limit.

"Containers" means all vessels, such as tanks, cylinders, or drums, used to transport or store LP-gases.

"DOT" means the federal Department of Transportation.

"DOT container" means a container that meets DOT regulations.

"DOT cylinder" means a cylinder that meets DOT regulations.

"DOT regulations/requirements/specifications" means the DOT regulations of 49 CFR part 178.

"Liquefied petroleum gases" and "LP-gas" means any material that is composed mostly of any of the following: Hydrocarbons, or mixtures of them; propane; propylene; butanes (normal butane or iso-butane); and butylenes.

"PSIA" pounds per square inch absolute.

"PSIG" means pounds per square inch gauge.

"Systems" means an assembly of the container or containers, major devices such as vaporizers, safety-relief valves, excess flow valves, regulators, and piping connecting such parts.

"Vaporizer-burner" means an integral vaporizer-burner unit, dependent upon the heat generated by the burner to vaporize the liquid used for dehydrators or dryers.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-41005, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-41007 When must LP-gas be odorized? You must ensure that all LP-gas is odorized by an approved agent to indicate by distinct odor, the presence of gas down to concentration in air of a maximum of 1/5 the lower limit of flammability.

Exception: Odorization is not required if it will create a hazard in further processing, or if it serves no useful purpose as a warning agent.

Note: The odorization requirement may be met by using 1.0 pounds of ethyl mercaptan, 1.0 pounds of thiophene, or 1.4 pounds of amyl mercaptan per ten thousand gallons of LP-gas. You may use any odorant and quantity that meets the requirements of this section.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-41007, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-41009 Must LP-gas containers and equipment be approved? (1) Each system of DOT containers must have approved container valves, connectors, manifold valve assemblies, and regulators.

(2) Each non-DOT system using containers of 2,000 gallons or less water capacity, must have a container assembly, one or more regulators, and other necessary parts. The entire system, or the container assembly with the regulators, must be individually listed by a nationally recognized testing laboratory.

"Container assembly" means the container and fittings for all openings, including shut-off valves, excess flow valves, liquid-level gauging devices, safety-relief devices, and protective housing.

(3) In systems using containers of over 2,000 gallons water capacity, each regulator, container, valve, excess flow valve, gauging device, and relief valve, must be listed by a nationally recognized testing laboratory.

(4) All DOT containers must be constructed, tested, and stamped according to the DOT specifications effective at the date of their manufacture.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-41009, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-41011 What construction and test requirements must containers meet? (1) Containers must be designed, constructed, and tested according to the *Rules for Construction of Unfired Pressure Vessels, section VIII, Division 1, American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code*, 1968 edition, unless otherwise specified.

(2) Containers constructed according to the 1949 and earlier editions of the ASME Code are exempt from U-2 through U-10 and U-19 of the code. Containers constructed

according to U-70 in the 1949 and earlier editions do not meet the requirements of this section.

(3) Containers designed, constructed, and tested prior to July 1, 1961, according to the *Code for Unfired Pressure Vessels for Petroleum Liquids and Gases*, 1951 edition with 1954 Addenda, of the American Petroleum Institute and the American Society of Mechanical Engineers are considered in compliance. Containers constructed according to API-ASME Code do not have to comply with section I or with the appendix to section I. W-601 through W-606 in the 1943 and earlier editions do not apply.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-41011, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-41013 How must containers be welded? (1) You must ensure that all welding to the shell, head, or any other part of the container subject to internal pressure, meets the requirements of the code under which the tank was fabricated. You may weld on saddle plates, lugs, or brackets attached to the container by the tank manufacturer.

(2) When you must repair or modify DOT containers by welding, you must return the container to a qualified manufacturer, making containers of the same type, to make the repair or modification according to DOT regulations.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-41013, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-41015 How must containers be marked? (1) You must ensure that containers are marked according to DOT regulations or with the following:

(a) Indication that the container meets the requirements of the code under which it is constructed, and all marks required by that code.

(b) Indication whether the container is designed for underground or aboveground installation or both. If intended for both and different style hoods are provided, the marking must indicate the proper hood for each type of installation.

(c) The name and address of the supplier of the container, or with the trade name of the container.

(d) The water capacity of the container in pounds or gallons, United States standard.

(e) The pressure in psig, for which the container is designed.

(f) The wording "This container must not contain a product with a vapor pressure greater than _ psig at 100°F."

(g) The tare weight, for containers with a water capacity of three hundred pounds or less.

(h) Indication of the maximum fill level for liquid at temperatures between 20°F and 130°F. Markings must be in maximum increments of 20°F. This marking may be located on the liquid level gauging device.

Exception: Containers provided with fixed maximum level indicators or that are filled by weighing are exempt from this requirement.

(i) The outside surface area in square feet.

(2) The markings must be on a metal nameplate attached to the container so that it is visible after the container is installed.

(3) When LP-gas and one or more other gases are stored or used in the same area, the containers must be marked to identify their content. Marking must be according to American National Standard Z48.1-1954, "Method of Marking Portable Compressed Gas Containers to Identify the Material Contained."

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-41015, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-41017 Where must containers be located? You must ensure that containers are located according to the following:

(1) Containers and first stage regulating equipment are located outdoors.

Containers may be located indoors under any of the following conditions:

(a) In buildings used exclusively for container charging, vaporization pressure reduction, gas mixing, gas manufacturing, or distribution;

(b) When portable use is necessary and meets the requirements of WAC 296-306A-41509;

(c) LP-gas fueled stationary or portable engines that meet the requirements of WAC 296-306A-42521 or 296-306A-42523;

(d) LP-gas fueled industrial trucks that meet the requirements of WAC 296-306A-42525;

(e) LP-gas fueled vehicles garaged according to WAC 296-306A-42527; or

(f) Containers awaiting use or resale when stored according to WAC 296-306A-430.

(2) Each individual container is located away from the nearest important building, group of buildings, or line of adjoining property that may be built on, according to Table U-1.

TABLE U-1
Minimum distances

Water capacity per container	Containers		Between above-ground containers
	Underground	Aboveground	
Less than 125 gals ^a	10 feet	None	None
125-250 gals	10 feet	10 feet	None
251-500 gals	10 feet	10 feet	3 feet
501-2,000 gals	25 feet ^b	25 feet ^b	3 feet
2,001-30,000 gals	50 feet	50 feet	5 feet
30,001-70,000 gals	50 feet	75 feet	1/4 of sum of diameters of adjacent containers
70,001-90,000 gals	50 feet	100 feet	1/4 of sum of diameters of adjacent containers

(a) If the total water capacity of a multicontainer installation at a consumer site is 501 gallons or more, the minimum distance must comply with this table, applying the aggregate capacity instead of the capacity per container. For

multiple installations, installations must be at least twenty-five feet apart. Do not apply the MINIMUM DISTANCES BETWEEN ABOVEGROUND CONTAINERS to such installations.

(b) Distance requirements may be reduced to 10 feet for a single container of 1200 gallons water capacity or less, if the container is at least 25 feet from any other LP-gas container of more than 125 gallons water capacity.

(c) In buildings devoted exclusively to gas manufacturing and distributing operations, the distances may be reduced if no containers of more than 500 gallons water capacity are located closer than ten feet to gas manufacturing and distributing buildings.

(3) Containers installed for use must not be stacked one above the other.

(4) In industrial installations involving containers of 180,000 gallons total water capacity or more, where serious exposures from the container to adjacent properties are common, firewalls or other means of protection designed and constructed according to good engineering practices are required.

(5) Readily ignitable material such as weeds and long dry grass is removed within ten feet of any container.

(6) The minimum separation between LP-gas containers and flammable liquid tanks is twenty feet; the minimum separation between a container and the centerline of the dike is ten feet.

Exception: This does not apply when LP-gas containers of 125 gallons or less capacity are installed adjacent to Class III flammable liquid tanks of 275 gallons or less capacity.

(7) The accumulation of flammable liquids under adjacent LP-gas containers is prevented by a means such as diking, diversion curbs, or grading.

(8) When dikes are used with flammable liquid tanks, no LP-gas containers are located within the diked area.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-41017, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-41019 What requirements apply to valves and accessories? (1) Valves, fittings, and accessories connected directly to the container including primary shut-off valves, must have a rated working pressure of at least 250 psig and must be of material and design suitable for LP-gas service. The use of cast iron for container valves, fittings, and accessories is prohibited. Container valves may be made of malleable or nodular iron.

(2) Connections to containers must have shut-off valves located as close to the container as practical.

Exception: This does not apply to safety-relief connections, liquid level gauging devices, and plugged openings.

(3) All required excess flow valves must close automatically at the rated flows of vapor or liquid specified by the manufacturer. The connections, lines, valves, and fittings must have a greater capacity than the rated flow of the excess flow valve.

(4) Liquid level gauging devices that are constructed so that outward flow is a maximum of that passed by a No. 54 drill size opening may be installed without excess flow valves.

(5) Openings from container or through fittings attached directly on container to which pressure gauge connection is

made, need not have shut-off or excess flow valves if such openings are restricted to not larger than No. 54 drill size opening.

(6) Required excess flow and back pressure check valves must be located inside the container or outside where the line enters the container. When located outside, the installation must be made to prevent any stress beyond the excess flow or back pressure check valve from causing a break between the container and the valve.

Exception: This does not apply to systems using containers with a water capacity greater than 2-1/2 pounds (nominal one pound LP-gas capacity).

(7) Excess flow valves must be designed with a bypass that is a maximum of No. 60 drill size opening to allow equalization of pressures.

(8) Containers of more than 30 gallons water capacity and less than 2,000 gallons water capacity, filled on a volumetric basis, and manufactured after December 1, 1963, must be equipped for filling into the vapor space.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-41019, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-41021 What requirements apply to piping, tubing, and fittings? (1) Pipe must be wrought iron or steel (black or galvanized), brass, copper, or aluminum alloy. Aluminum alloy pipe must be at least Schedule 40 according to the specifications for Aluminum Alloy Pipe, ANSI H38.7-1969 (ASTM, B241-1969), and must be suitably marked at each end of each length indicating compliance with ANSI specifications. Alloy 5456 is prohibited.

Exception: This does not apply to piping for LP-gas used as a motor fuel or to piping on commercial vehicles.

(2) Aluminum alloy pipe must be protected against external corrosion whenever:

(a) It is in contact with dissimilar metals other than galvanized steel; or

(b) Its location is subject to repeated wetting by such liquids as water (except rain water), detergents, sewage, or leaking from other piping; or

(c) It passes through flooring, plaster, masonry, or insulation.

Galvanized sheet steel or pipe, galvanized inside and out, are considered suitable protection.

(3) Aluminum pipe must be three-fourths inch nominal and shall not be used for pressures exceeding 20 psig. Aluminum alloy pipe must not be installed within six inches of the ground.

(a) Vapor piping with operating pressures not exceeding 125 psig must be suitable for a working pressure of at least 125 psig. Pipe must be at least Schedule 40 ASTM A-53-69, Grade B Electric Resistance Welded and Electric Flash Welded Pipe or equal.

(b) Vapor piping with operating pressures over 125 psig and all liquid piping must be suitable for a working pressure of at least 250 psig. Pipe must be at least Schedule 80 if joints are threaded or threaded and back welded. At least Schedule 40 (ASTM A-53-1969 Grade B Electric Resistance Welded and Electric Flash Welded Pipe or equal) must be used if joints are welded, or welded and flanged.

(4) Tubing must be seamless copper, brass, steel, or aluminum alloy. Copper tubing must be of Type K or L or equivalent as covered in the Specification for Seamless Copper Water Tube, ANSI H23.1-1970 (ASTM B88-1969). Aluminum alloy tubing must be of Type A or B or equivalent as covered in Specification ASTM B210-1968 and must be suitably marked every 18 inches indicating compliance with ASTM specifications. The minimum nominal wall thickness of copper tubing and aluminum alloy tubing must be as specified in Table U-2 and Table U-3.

TABLE U-2
WALL THICKNESS OF COPPER TUBING¹

Note: The standard tube size is one-eighth-inch smaller than its nominal outside diameter.

Standard size (inches)	Nominal O.D. (inches)	Nominal wall thickness (inches)	
		Type K	Type L
1/4	0.375	0.035	0.030
3/8	0.500	0.049	0.035
1/2	0.625	0.049	0.040
5/8	0.750	0.049	0.042
3/4	0.875	0.065	0.045
1	1.125	0.065	0.050
1 1/4	1.375	0.065	0.055
1 1/2	1.625	0.072	0.060
2	2.125	0.083	0.070

¹Based on data in Specification for Seamless Copper Water Tubing, ANSI H23.1-1970 (ASTM B-88-69).

TABLE U-3
WALL THICKNESS OF ALUMINUM ALLOY TUBING¹

Outside diameter (inches)	Nominal wall thickness (inches)	
	Type A	Type B
3/8	0.035	0.049
1/2	0.035	0.049
5/8	0.042	0.049
3/4	0.049	0.058

¹Based on data in Standard Specification for Aluminum-Alloy Drawn Seamless Coiled Tubes for Special Purpose Applications, ASTM B210-68.

(5) Aluminum alloy tubing must be protected against external corrosion whenever:

(a) It is in contact with dissimilar metals other than galvanized steel; or

(b) Its location is subject to repeated wetting by liquids such as water (except rainwater), detergents, sewage, or leakage from other piping; or

(c) It passes through flooring, plaster, masonry, or insulation.

Galvanized sheet steel or pipe, galvanized inside and out, are considered suitable protection.

(6) The maximum outside diameter for aluminum alloy tubing must be three-fourths inch and must not be used for pressures exceeding 20 psig. Aluminum alloy tubing installed within six inches of the ground is prohibited.

(7) In systems where the gas in liquid form enters the building without pressure reduction, only heavy walled seamless brass or copper tubing with an internal diameter a

maximum of 3/32 inch, and a wall thickness of at least 3/64 inch shall be used.

Exception: This requirement does not apply to research and experimental laboratories, buildings or separate fire divisions of buildings used exclusively for housing internal combustion engines, and to commercial gas plants or bulk stations where containers are charged, nor to industrial vaporizer buildings, nor to buildings, structures, or equipment under construction or undergoing major renovation.

(8) Pipe joints must be screwed, flanged, welded, soldered, or brazed with a material having a melting point over 1,000°F. Joints on seamless copper, brass, steel, or aluminum alloy gas tubing shall be made by approved gas tubing fittings, or soldered or brazed with a material having a melting point over 1,000°F.

(9) For operating pressures of 125 psig or less, fittings must be designed for a pressure of at least 125 psig. For operating pressures above 125 psig, fittings must be designed for a minimum of 250 psig.

(10) Threaded cast iron pipe fittings are prohibited. Aluminum alloy fittings must be used with aluminum alloy pipe and tubing. Insulated fittings must be used where aluminum alloy pipe or tubing connects with a dissimilar metal. You may use malleable, nodular, or higher strength gray iron for fittings.

Note: Strainers, regulators, meters, compressors, pumps, etc., are not to be considered as pipe fittings.

(11) All materials such as valve seats, packing, gaskets, diaphragms, etc., must be resistant to the action of LP-gas under the service conditions to which they are subjected.

(12) All piping, tubing, or hose must be tested after assembly and proved free from leaks at least normal operating pressures. After installation, piping and tubing of all domestic and commercial systems must be tested and proved free of leaks using a manometer or equivalent device that will indicate a drop in pressure. Test made by flame is prohibited.

(13) You must ensure that piping allows for expansion, contraction, jarring, and vibration, and settling. You may use flexible connections.

(14) Piping outside buildings may be buried, above-ground, or both, but must be well supported and protected against physical damage. Where soil conditions warrant, all piping must be protected against corrosion. Where condensation may occur, the piping must be pitched back to the container, or you must provide a means for reevaporation of the condensate.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-41021, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-41023 What specifications must hoses meet? (1) Hose shall be fabricated of materials that are resistant to the action of LP-gas in the liquid and vapor phases. If wire braid is used for reinforcing the hose, it must be of corrosion-resistant material such as stainless steel.

(2) Hose subject to container pressure must be marked "LP-gas" or "LPG" at not greater than ten-foot intervals.

(3) Hose subject to container pressure must be designed for a bursting pressure of not less than 1,250 psig.

(4) Hose subject to container pressure must be listed by a nationally recognized testing laboratory.

(5) Hose connections subject to container pressure must be able to withstand, without leaking, a test pressure of not less than 500 psig.

(6) Hose and hose connections on the low-pressure side of the regulator or reducing valve must be designed for a bursting pressure of not less than 125 psig or five times the set pressure of the relief devices protecting that portion of the system, whichever is higher.

(7) Hose may be used on the low-pressure side of regulators to connect to other than domestic and commercial gas appliances under the following conditions:

(a) The appliances connected with hose are portable and need a flexible connection.

(b) For use inside buildings, the hose is of minimum practical length, but is a maximum of six feet. Hose must not extend from one room to another, nor pass through any walls, partitions, ceilings, or floors. Such hose must not be concealed from view or used in a concealed location.

Exception: For use outside of buildings, the hose may exceed this length but must be kept as short as practical.

(c) The hose must be approved and must not be used where it may be exposed to temperatures above 125°F. The hose must be securely connected to the appliance. Rubber slip ends are prohibited.

(d) The shut-off valve for an appliance connected by hose must be in the metal pipe or tubing and not at the appliance end of the hose. When shut-off valves are installed close to each other, precautions must be taken to prevent operation of the wrong valve.

(e) Hose used for connecting to wall outlets must be protected from physical damage.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-41023, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-41025 What requirements apply to safety devices? (1) Every container except those constructed according to DOT specifications and every vaporizer (except motor fuel vaporizers and vaporizers described in WAC 296-306A-41029(3) and 296-306A-42007 (6)(a) whether heated by artificial means or not, must have one or more safety-relief valves of spring-loaded or equivalent type. These valves must be arranged to afford free vent to the outer air with discharge not less than five feet horizontally away from any opening into the building that is below such discharge. The rate of discharge must be according to the requirements of subsection (2) or (4) of this section.

(2) Minimum required rate of discharge in cubic feet per minute of air at one hundred twenty percent of the maximum permitted start to discharge pressure for safety-relief valves to be used on containers other than those constructed according to DOT specification must be as follows:

Surface area sq. ft.	Flow rate CFM air	Surface area sq. ft.	Flow rate CFM air	Surface area sq. ft.	Flow rate CFM air
20 or less	626	170	3,620	550	9,470
25	751	175	3,700	600	10,170
30	872	180	3,790	650	10,860
35	990	185	3,880	700	11,550
40	1,100	190	3,960	750	12,220

45	1,220	195	4,050	850	13,540
50	1,330	200	4,130	900	14,190
55	1,430	210	4,300	950	14,830
60	1,540	220	4,470	1,000	15,470
65	1,640	230	4,630	1,050	16,100
70	1,750	240	4,800	1,100	16,720
75	1,850	250	4,960	1,150	17,350
80	1,950	260	5,130	1,200	17,960
85	2,050	270	5,290	1,250	18,570
90	2,150	280	5,450	1,300	19,180
95	2,240	290	5,610	1,350	19,780
100	2,340	300	5,760	1,400	20,380
105	2,440	310	5,920	1,450	20,980
110	2,530	320	6,080	1,500	21,570
115	2,630	330	6,230	1,550	22,160
120	2,720	340	6,390	1,600	22,740
125	2,810	350	6,540	1,650	23,320
130	2,900	360	6,690	1,700	23,900
135	2,990	370	6,840	1,750	24,470
140	3,080	380	7,000	1,800	25,050
145	3,170	390	7,150	1,850	25,620
150	3,260	400	7,300	1,900	26,180
155	3,350	450	8,040	1,950	26,750
160	3,440	500	8,760	2,000	27,310
165	3,530				

Surface area = total outside surface area of container in square feet.

(3) When the surface area is not stamped on the name plate or when the marking is not legible, calculate the area with one of the following formulas:

• Hemispherical heads: Area = (overall length) X (outside diameter) X 3.1416.

• Other than hemispherical heads: Area = (overall length) + 0.3 (outside diameter) X (outside diameter) X 3.1416.

Note: This formula is not exact, but will give results within the limits of practical accuracy for the sole purpose of sizing relief valves.

• Spherical container: Area = (outside diameter)² X 3.1416.

• Flow rate: CFM air = required flow capacity in cubic feet per minute of air at standard conditions, 60°F and atmospheric pressure (14.7 psia).

For containers with total outside surface area greater than 2,000 sq. ft., the formula is: Flow rate CFM air = 53.632 A^{0.82} where A = outside surface area of the container in square feet.

Valves not marked "air" have flow rate marking in cubic feet per minute of LP-gas. These can be converted to ratings in cubic feet per minute of air by multiplying the LP-gas ratings by factors listed below. Air flow ratings can be converted to ratings in cubic feet per minute of LP-gas by dividing the air ratings by the factors listed below.

AIR CONVERSION FACTORS

Container type	100	125	150	175	200
Air conversion factor	1.162	1.142	1.113	1.078	1.010

(4) The minimum required rate of discharge for safety-relief valves for LP-gas vaporizers (steam heated, water heated, and direct fired) must be determined as follows:

(a) Obtain the total surface area by adding the surface area of vaporizer shell in square feet directly in contact with LP-gas and the heat exchanged surface area in square feet directly in contact with LP-gas.

(b) Obtain the minimum required rate of discharge in cubic feet of air per minute, at 60°F and 14.7 psia from subsection (2) of this section, for this total surface area.

(5) Container and vaporizer safety-relief valves must be set to start to discharge, with relation to the design pressure of the container, according to the following:

Containers	Minimum (percent)	Maximum (percent)
ASME Code; Par. U-68, U-69—1949 and earlier editions	110	*125
ASME Code; Par. U-200, U-201—1949 edition	88	*100
ASME Code—1950, 1952, 1956, 1959, 1962, 1965 and 1968 (Division I) editions	88	*100
API—ASME Code—all editions	88	*100
DOT	As prescribed in 49 CFR Chapter I	

* Manufacturers of safety-relief valves are allowed a plus tolerance not exceeding 10% of the set pressure marked on the valve.

(6) Safety-relief devices used with systems employing non-DOT containers must be constructed to discharge at not less than the rates shown in subsection (2) of this section, before the pressure is in excess of 120% of the maximum (not including the 10% referred to in subsection (5) of this section) permitted start-to-discharge pressure setting of the device.

(7) In high temperature areas, you must use a lower vapor pressure product or a higher designed pressure vessel to prevent the safety valves from opening. The tanks may be protected by cooling devices such as spraying, shading, or other means.

(8) Safety-relief valves must be arranged to minimize tampering. For external pressure setting or adjustment, the relief valves must have an approved sealable adjustment.

(9) Shut-off valves are prohibited between safety-relief devices and the container, equipment, or piping.

Exception: A shut-off valve may be used where the arrangement of the valve allows the required capacity flow through the safety-relief device.

(10) Safety-relief valves must have direct communication with the vapor space of the container.

(11) Each safety-relief valve must be plainly and permanently marked with the following:

(a) Container type of the pressure vessel on which the valve is designed to be installed;

(b) The pressure in psig at which the valve is set to discharge;

(c) The actual rate of discharge of the valve in cubic feet per minute of air at 60°F and 14.7 psia; and

(d) The manufacturer's name and catalog number.

For example: T200-250-4050 AIR: Indicates that the valve is suitable for use on a Type 200 container, that it is

set to start to discharge at 250 psig; and that its rate of discharge is 4,050 cubic feet per minute of air.

(12) Safety-relief valve assemblies and their connections must be large enough to provide the required rate of flow for the container on which they are installed.

(13) A hydrostatic relief valve must be installed between each pair of shut-off valves on LP-gas liquid piping. The start-to-discharge pressure setting of such relief valves must be a maximum of 500 psig. The minimum setting on relief valves installed in piping connected to non-DOT containers shall be 140% of the container relief valve setting. For piping connected to DOT containers, the minimum must be 400 psig. The relief valve should not be installed in the pump discharge piping if the same protection can be provided by installing the relief valve in the suction piping. The start-to-discharge pressure setting of such a relief valve, if installed on the discharge side of a pump, must exceed the maximum pressure permitted by the recirculation device in the system.

(14) The discharge from any safety-relief device must not terminate in or beneath any building.

Exception: This requirement does not apply to relief devices covered by WAC 296-306A-41017(1), 296-306A-41507(1) or 296-306A-41509.

(15) Container safety-relief devices and regulator relief vents must be located at least five feet in any direction from air openings into sealed combustion system appliances or mechanical ventilation air intakes.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-41025, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-41027 How must indirect fired vaporizers be constructed and installed? Indirect fired vaporizers utilizing steam, water, or other heating medium must be constructed and installed according to the following:

(1) Vaporizers must be constructed according to the requirements of WAC 296-306A-41011 and must be permanently marked as follows:

(a) With the code marking signifying the specifications to which the vaporizer is constructed;

(b) With the allowable working pressure and temperature for which the vaporizer is designed;

(c) With the sum of the outside surface area and the inside heat exchange surface area expressed in square feet; and

(d) With the name or symbol of the manufacturer.

(2) Vaporizers with an inside diameter of six inches or less exempted by the ASME Unfired Pressure Vessel Code, Section VIII of the ASME Boiler and Pressure Vessel Code, 1968, must have a design pressure of at least 250 psig and need not be permanently marked.

(3) Heating or cooling coils installed inside a storage container are prohibited.

(4) Vaporizers may be installed in buildings, rooms, sheds, or lean-tos used exclusively for gas manufacturing or distribution, or in other light, noncombustible structures that are well ventilated near the floor line and roof.

Exception: When vaporizing and/or mixing equipment is in a structure not used exclusively for gas manufacturing or distribution, the structure or room must be separated from the remainder of the building. The separation must be a wall

designed to withstand a static pressure of at least 100 pounds per square foot. This wall must have no openings or pipe or conduit passing through it. Such structure or room must have adequate ventilation and must have a roof or at least one exterior wall of lightweight construction.

(5) All DOT vaporizers must have, at or near the discharge, a safety-relief valve providing an effective rate of discharge according to WAC 296-306A-41025.

(6) The heating medium lines into and out of the vaporizer must have a mechanism to prevent the flow of gas into the heat systems in the event of tube rupture in the vaporizer. Vaporizers must have an automatic means to prevent liquid from passing through the vaporizers to the gas discharge piping.

(7) The device that supplies heat to produce steam, hot water, or other heat may be installed in a building, compartment, room, or lean-to ventilated near the floorline and roof to the outside. The device must be separated from all compartments or rooms containing LP-gas vaporizers, pumps, and central gas mixing devices by a wall designed to withstand a static pressure of at least 100 pounds per square foot. This wall must have no openings or pipes or conduit passing through it.

Exception: This requirement does not apply to the domestic water heaters that may supply heat for a vaporizer in a domestic system.

(8) Gas-fired heating systems supplying heat exclusively for vaporization must have automatic safety devices to shut off the flow of gas to main burners, if the pilot light should fail.

(9) Vaporizers may be an integral part of a fuel storage container directly connected to the liquid section or gas section or both.

(10) Fusible plugs are prohibited on vaporizers.

(11) Vaporizer houses must not have unprotected drains to sewers or sump pits.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-41027, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-41029 How must atmospheric vaporizers be constructed and installed? Atmospheric vaporizers using heat from the ground or surrounding air must be installed as follows:

(1) Buried underground; or

(2) Located inside the building near where the pipe enters the building, if the capacity of the unit does not exceed one quart;

(3) Vaporizers of less than one quart capacity heated by the ground or surrounding air, may be installed without safety-relief valves if tests show that the assembly is safe.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-41029, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-41031 How must direct gas-fired vaporizers be constructed and installed? Direct gas-fired vaporizers must be constructed, marked, and installed as follows:

(1) According to the requirements of the *American Society of Mechanical Engineers Boiler and Pressure Vessel Code*, 1968, that apply to the maximum working conditions for which the vaporizer is designed.

(2) With the name of the manufacturer; rated Btu input to the burner; the area of the heat exchange surface in square feet; the outside surface of the vaporizer in square feet; and the maximum vaporizing capacity in gallons per hour.

(3) Vaporizers may be connected to the liquid section or the gas section of the storage container, or both. The container must have a manually operated valve in each connection that completely shuts off when desired, all flow of gas or liquid from container to vaporizer.

(4) Vaporizers with a maximum capacity of 35 gallons per hour must be located at least 5 feet from container shut-off valves. Vaporizers more than 35 gallon capacity but a maximum of 100 gallons per hour must be located at least 10 feet from the container shut-off valves. Vaporizers having a capacity greater than 100 gallons per hour must be located at least 15 feet from container shut-off valves.

(5) Vaporizers may be installed in buildings, rooms, housings, sheds, or lean-tos used exclusively for vaporizing or mixing of LP-gas. Vaporizing housing structures must be noncombustible, and well ventilated near the floorline and the highest point of the roof. When vaporizer and/or mixing equipment is located in a structure or room attached to or within a building, such structure or room must be separated from the remainder of the building by a wall designed to withstand a static pressure of at least 100 pounds per square foot. This wall must have no openings or pipes or conduit passing through it. The structure or room must have adequate ventilation, and a roof or at least one exterior wall of lightweight construction.

(6) Vaporizers must have at or near the discharge, a safety-relief valve providing an effective rate of discharge according to WAC 296-306A-41025. The relief valve must be located where it is not subjected to temperatures over 140°F.

(7) Vaporizers must have suitable automatic means to prevent liquid passing from the vaporizer to the gas discharge piping of the vaporizer.

(8) Vaporizers must have means for manually turning off the gas to the main burner and pilot.

(9) Vaporizers must have automatic safety devices to shut off the flow of gas to main burners if the pilot light should fail. When the flow through the pilot exceeds 2,000 Btu per hour, the pilot also must have an automatic safety device to shut off the flow of gas to the pilot should the pilot flame be extinguished.

(10) Pressure regulating and pressure reducing equipment located within 10 feet of a direct fired vaporizer must be separated from the open flame by an airtight noncombustible partition.

(11) Except as provided in subsection (5) of this section, the following minimum distances must be maintained between direct fired vaporizers and the nearest important building, group of buildings, or line of adjoining property that may be built on:

(a) Ten feet for vaporizers with a vaporizing capacity of 15 gallons per hour or less;

(b) Twenty-five feet for vaporizers with a vaporizing capacity of 16-100 gallons per hour;

(c) Fifty feet for vaporizers with a vaporizing capacity over 100 gallons per hour.

(12) Direct fired vaporizers must not raise the product pressure above the design pressure of the vaporizer equip-

ment or above the pressure shown in the second column of Table U-8.

(13) Fusible plugs are prohibited on vaporizers.

(14) Vaporizers must not have unprotected drains to sewers or sump pits.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-41031, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-41033 How must direct gas-fired tank heaters be constructed and installed? Direct gas-fired tank heaters must be constructed and installed as follows:

(1) Direct gas-fired tank heaters, and tanks to which they are applied, must only be installed aboveground.

(2) Tank heaters must be permanently marked with the name of the manufacturer, the rated Btu input to the burner, and the maximum vaporizing capacity in gallons per hour.

Note: Tank heaters may be an integral part of a fuel storage container directly connected to the container liquid section, or vapor section, or both.

(3) Tank heaters must have a means for manually turning off the gas to the main burner and pilot.

(4) Tank heaters must have an automatic safety device to shut off the flow of gas to main burners, if the pilot light should fail. When flow through pilot exceeds 2,000 Btu per hour, the pilot also must have an automatic safety device to shut off the flow of gas to the pilot should the pilot flame be extinguished.

(5) Pressure regulating and pressure reducing equipment if located within ten feet of a direct fired tank heater must be separated from the open flame by a substantially airtight noncombustible partition.

(6) The following minimum distances must be maintained between a storage tank heated by a direct fired tank heater and the nearest important building, group of buildings, or line of adjoining property that may be built on:

(a) Ten feet for storage containers of less than 500 gallons water capacity;

(b) Twenty-five feet for storage containers of 500-1,200 gallons water capacity;

(c) Fifty feet for storage containers of over 1,200 gallons water capacity.

(7) No direct fired tank heater may raise the product pressure within the storage container over 75% of the pressure in the second column of Table U-8.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-41033, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-41035 How must dehydrators be constructed and installed? The vaporizer section of vaporizer-burners used for dehydrators or dryers must be located outdoors; they must be constructed and installed as follows:

(1) Vaporizer-burners must have a minimum design pressure of 250 psig with a factor safety of five.

(2) Manually operated positive shut-off valves must be located at the containers to shut off all flow to the vaporizer-burners.

(3) Minimum distances between storage containers and vaporizer-burners must be as follows:

Water capacity per container (gallons)

Minimum distances (feet)

Less than 501

10

501 to 2,000

25

Over 2,000

50

(4) The vaporizer section of vaporizer-burners must be protected by a hydrostatic relief valve. The relief valve must be located where it is not subjected to temperatures over 140°F. The start-to-discharge pressure setting must protect the components involved, and be at least 250 psig. The discharge must be directed upward and away from component parts of the equipment and away from operating personnel.

(5) Vaporizer-burners must have means for manually turning off the gas to the main burner and pilot.

(6) Vaporizer-burners must have automatic safety devices to shut off the flow of gas to the main burner and pilot in the event the pilot is extinguished.

(7) Pressure regulating and control equipment must be located or protected so that the temperatures surrounding this equipment shall not exceed 140°F.

Exception: Equipment components may be used at higher temperatures if designed to withstand such temperatures.

(8) Pressure regulating and control equipment when located downstream of the vaporizer must be designed to withstand the maximum discharge temperature of the vapor.

(9) Fusible plugs are prohibited on the vaporizer section of vaporizer-burners.

(10) Vaporizer coils or jackets must be made of ferrous metal or high temperature alloys.

(11) Equipment utilizing vaporizer-burners must have automatic shut-off devices upstream and downstream of the vaporizer section connected so as to operate in the event of excessive temperature, flame failure, and, if applicable, insufficient airflow.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-41035, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-41037 What are the maximum filling densities? (1) "Filling density" means the percent ratio of the weight of the gas in a container to the weight of water the container will hold at 60°F. All containers shall be filled according to the filling densities shown in Table U-4.

**TABLE U-4
MAXIMUM PERMITTED FILLING DENSITY**

Specific Gravity at 60°F (15.6°C)	Aboveground containers		Underground containers, all capacities
	0 to 1,200 U.S. gals. (1,000 imp. gal. 4,500 liters) total water cap	0 to 1,200 U.S. gals. (1,000 imp. gal. 4,500 liters) total water cap	
	Percent	Percent	Percent
.496-.503	41	44	45
.504-.510	42	45	46

.511-.519	43	46	47
.520-.527	44	47	48
.528-.536	45	48	49
.537-.544	46	49	50
.545-.552	47	50	51
.553-.560	48	51	52
.561-.568	49	52	53
.569-.576	50	53	54
.577-.584	51	54	55
.585-.592	52	55	56
.593-.600	53	56	57

(2) Any container including mobile cargo tanks and portable tank containers regardless of size or construction, shipped under DOT jurisdiction or constructed according to DOT specifications must be charged according to DOT requirements.

(3) Exception: Portable containers not subject to DOT jurisdiction must be filled either by weight, or by volume using a fixed length dip tube gauging device.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-41037, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-41039 What requirements apply to LP-gas in buildings? (1) Vapor may be piped into buildings at pressures over 20 psig only if the buildings or separate areas thereof:

- (a) Are constructed according to this section;
- (b) Are used exclusively to house equipment for vaporization, pressure reduction, gas mixing, gas manufacturing, or distribution, or to house internal combustion engines, industrial processes, research and experimental laboratories, or equipment and processes using such gas and having similar hazard;

(c) Are buildings, structures, or equipment under construction or undergoing major renovation.

(2) Liquid may be permitted in buildings as follows:

(a) In buildings, or separate areas of buildings, used exclusively to house equipment for vaporization, pressure reduction, gas mixing, gas manufacturing, or distribution, or to house internal combustion engines, industrial processes, research and experimental laboratories, or equipment and processes using such gas and having similar hazard; and when such buildings, or separate areas are constructed according to this section.

(b) In buildings, structures, or equipment under construction or undergoing major renovation if the temporary piping meets the following conditions:

(i) Liquid piping inside the building meets the requirements of WAC 296-306A-41021 and is a maximum of three-fourths iron pipe size. Copper tubing with an outside diameter of 3/4 inch or less may be used if it meets the requirements of Type K of Specifications for Seamless Water Tube, ANSI H23.1-1970 (ASTM B88-1969). (See Table U-2.) All such piping must be protected against construction hazards. Liquid piping inside buildings must be kept to a minimum. Such piping must be securely fastened to walls or other surfaces to provide adequate protection from breakage and located to subject the liquid line to the lowest ambient temperatures.

(ii) A shut-off valve must be installed in each intermediate branch line where it takes off the main line and must be

readily accessible. A shut-off valve must also be placed at the appliance end of the intermediate branch line. Such shut-off valve must be upstream of any flexible connector used with the appliance.

(iii) Suitable excess flow valves must be installed in the container outlet line supplying liquid LP-gas to the building. A suitable excess flow valve must be installed immediately downstream of each shut-off valve. Excess flow valves must be installed where piping size is reduced and must be sized appropriately.

(iv) Hydrostatic relief valves must be installed according to WAC 296-306A-41025(13).

(v) Using hose to carry liquid between the container and the building or at any point in the liquid line, except at the appliance connector, is prohibited.

(vi) Where flexible connectors are necessary for appliance installation, such connectors must be as short as practical and must meet the requirements of WAC 296-306A-41021(4) or 296-306A-41023.

(vii) Release of fuel when any section of piping or appliances is disconnected must be minimized by either of the following methods:

(A) Using an approved automatic quick-closing coupling (closing in both directions when coupled in the fuel line); or

(B) Closing the valve nearest to the appliance and allowing the appliance to operate until the fuel in the line is consumed.

(viii) See WAC 296-306A-41509 for the conditions under which portable containers may be brought indoors.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-41039, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-41041 What requirements apply to transfer of liquids? When transferring liquids, you must ensure that:

(1) At least one attendant remains close to the transfer connection from the time the connections are first made until they are finally disconnected, during the transfer of the product.

(2) Containers must be filled or used only upon authorization of the owner.

(3) Containers manufactured according to DOT specifications authorized by DOT as a "single trip" or "nonrefillable container" must not be refilled or reused in LP-gas service.

(4) Gas or liquid must not be vented to the atmosphere to assist in transferring contents of one container to another, except as provided in WAC 296-306A-42509(4). A listed pump may use LP-gas in the vapor phase as a source of energy. The gas may be vented to the atmosphere at a rate not to exceed that from a No. 31 drill size opening, if venting and liquid transfer are located at least 50 feet from the nearest important building.

(5) Filling fuel containers for industrial trucks or motor vehicles from industrial bulk storage containers must be performed at least ten feet from the nearest important masonry-walled building or at least twenty-five feet from the nearest important building or other construction and always at least 25 feet from any building opening.

(6) Filling portable containers, containers mounted on skids, fuel containers on farm tractors, or similar applica-

tions, from storage containers used in domestic or commercial service, must be performed at least 50 feet from the nearest important building.

(7) The filling connection and the vent from the liquid level gauges in containers, filled at point of installation, must be at least ten feet in any direction from air openings into sealed combustion system appliances or mechanical ventilation air intakes.

(8) Fuel supply containers must be gauged and charged only in the open air or in buildings especially provided for that purpose.

(9) Marketers and users must exercise precaution to ensure that only those gases for which the system is designed, examined, and listed, are employed in its operation, particularly with regard to pressures.

(10) Pumps or compressors must be designed for use with LP-gas. When compressors are used they must normally take suction from the vapor space of the container being filled and discharge to the vapor space of the container being emptied.

(11) Pumping systems, when equipped with a positive displacement pump, must include a recirculating device that limits the differential pressure on the pump under normal operating conditions to the maximum differential pressure rating of the pump. The discharge of the pumping system must be protected so that pressure is a maximum of 350 psig. If a recirculation system discharges into the supply tank and contains a manual shut-off valve, an adequate secondary safety recirculation system must be incorporated that has no means of rendering it inoperative. Manual shut-off valves in recirculation systems must be kept open except during an emergency or when repairs are being made to the system.

(12) When necessary, unloading piping or hoses must have suitable bleeder valves for relieving pressure before disconnection.

(13) Agricultural air moving equipment, including crop dryers, shall be shut down when supply containers are filling unless the air intakes and sources of ignition on the equipment are located 50 feet or more from the container.

(14) Agricultural equipment employing open flames or equipment with integral containers, such as flame cultivators, weed burners, and tractors, must be shut down during refueling.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-41041, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-41043 Must workers be trained?

Workers performing installation, removal, operation, and maintenance work must be properly trained in that function.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-41043, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-41045 What fire protection must be provided for LP-gas installations?

(1) Open flames or other sources of ignition are prohibited in vaporizer rooms (except those housing direct-fired vaporizers), pumphouses, container charging rooms or other similar locations. Direct-fired vaporizers are prohibited in pumphouses or container charging rooms.

Note: LP-gas storage containers do not require lightning protection. Since LP-gas is contained in a closed system of piping and equipment, the system need not be electrically conductive or electrically bonded for protection against static electricity. (See NFPA No. 77-1972-1973, Recommended Practice for Static Electricity.)

(2) Open flames (except as provided in subsection (1) of this section), cutting or welding, portable electric tools, and extension lights capable of igniting LP-gas, are prohibited within classified areas specified in Table U-5 unless the LP-gas facilities have been freed of all liquid and vapor, or special precautions observed under carefully controlled conditions.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-41045, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-41047 What electrical requirements apply to LP-gas installations? (1) Electrical equipment and wiring must be specified by and installed according to chapter 296-306A WAC Part T, for ordinary locations.

(2) Fixed electrical equipment and wiring installed within classified areas must comply with Table U-5 and must be installed according to chapter 296-306A WAC Part T.

Exception: This provision does not apply to fixed electrical equipment at residential or commercial installations of LP-gas systems, LP-gas used as a motor fuel, or to LP-gas system installations on commercial vehicles.

TABLE U-5

Part	Location	Extent of classified area ¹	Equipment shall be suitable for Class I, Group D ²
A	Storage containers other than DOT cylinders	Within 15 feet in all directions from connections, except connections otherwise covered in this table	Division 2
B	Tank vehicle and tank car loading and unloading ³	Within 5 feet in all directions from connections regularly made or disconnected for product transfer	Division 1
		Beyond 5 feet but within 15 feet in all directions from a point where connections are regularly made or disconnected and within the cylindrical volume between the horizontal equator of the sphere and grade (See Figure H-1)	Division 2
C	Gauge vent openings other than those on DOT cylinders	Within 5 feet in all directions from point of discharge	Division 1

		Beyond 5 feet but within 15 feet in all directions from point of discharge	Division 2		Up to 18 inches above grade within 20 ft. horizontally from any edge of enclosure	Division 2
D	Relief valve discharge other than those on DOT cylinders	Within direct path of discharge	Division 1 <i>Note:</i> Fixed electrical equipment should not be installed		<i>Note:</i> For pits within this area, see Part F of this table	
		Within 5 feet in all directions from point of discharge	Division 1	G	Pits or trenches containing or located beneath LP-gas valves, pumps, compressors, regulators, and similar equipment	
		Beyond 5 feet but within 15 feet in all directions from point of discharge except within the direct path of discharge	Division 2		Without mechanical ventilation	Entire pit or trench Division 1
E	Pumps, compressors, gas-air mixers and vaporizers other than direct fired					Entire room and any adjacent room not separated by a gastight partition Division 2
	Indoors without ventilation	Entire room and any adjacent room not separated by a gastight partition	Division 1			Within 15 feet in all directions from pit or trench when located outdoors Division 2
		Within 15 feet of the exterior side of any exterior wall or roof that is not vaportight or within 15 feet of any exterior opening	Division 2		With adequate mechanical ventilation	Entire pit or trench Division 2
	Indoors with adequate ventilation ⁴	Entire room and any adjacent room not separated by a gastight partition	Division 2			Entire room and any adjacent room not separated by a gastight partition Division 2
	Outdoors in open air at or above grade	Within 15 feet in all directions from this equipment and within the cylindrical volume between the horizontal equator of the sphere and grade (See Figure H-1)	Division 2			Within 15 feet in all directions from pit or trench when located outdoors Division 2
F	Service station dispensing units	Entire space within dispenser enclosure, and 18 inches horizontally from enclosure exterior up to an elevation 4 ft. above dispenser base. Entire pit or open space beneath dispenser	Division 1	H	Special buildings or rooms for storage of portable containers	Entire room Division 2
				I	Pipelines and connections containing operational bleeds, drips, vents or drains	Within 5 ft. in all directions from point of discharge Division 1

		Beyond 5 ft. from point of discharge, same as Part E of this table	
J	Container filling		
	Indoors without ventilation	Entire room	Division 1
	Indoors with adequate ventilation ⁴	Within 5 feet in all directions from connections regularly made or disconnected for product transfer	Division 1
		Beyond 5 feet and entire room	Division 2

Outdoors in open air

Within 5 feet in all directions from connections regularly made or disconnected for product transfer

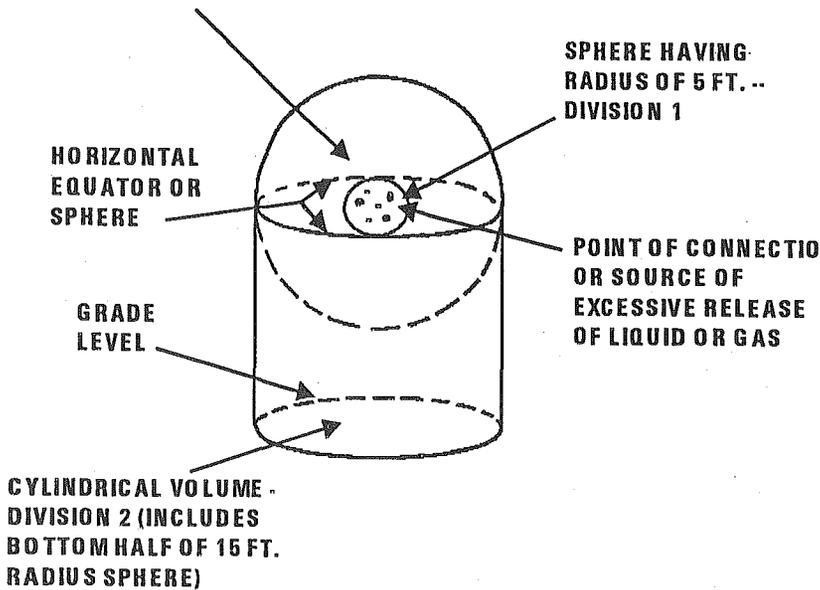
Division 1

Beyond 5 feet but within 15 feet in all directions from a point where connections are regularly made or disconnected and within the cylindrical volume between the horizontal equator of the sphere and grade (See Fig. H-1.)

Division 2

¹The classified area must not extend beyond an unpierced wall, roof, or solid vaportight partition.
²See chapter 296-46 WAC, and chapter 296-306A WAC Part T.
³When classifying the extent of a hazardous area, consider the possible variations in the spotting of tank cars and tank vehicles at the unloading points and the effect these variations of actual spotting point may have on the point of connection.
⁴Ventilation, either natural or mechanical, is considered adequate when the concentration of the gas in a gas-air mixture does not exceed twenty-five percent of the lower flammable limit under normal operating conditions.

SPHERE HAVING RADIUS OF 15 FT. -- DIVISION 2



[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-41047, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-41049 What requirements apply to liquid-level gauging devices? (1) Each container manufactured after December 31, 1965, and filled on a volumetric basis must have a fixed liquid-level gauge to indicate the maximum permitted filling level according to subsection (5) of this section. Each container manufactured after December 31, 1969, must have permanently attached to the container adjacent to the fixed level gauge a marking showing the percentage full that will be shown by that gauge. When

used with a variable liquid-level gauge, the fixed liquid-level gauge will act as a check on the variable gauge. Gauges must be used in charging containers as required in WAC 296-306A-41034.

(2) All variable gauging devices must be arranged so that the maximum liquid level for butane, for a 50/50 mixture of butane and propane, and for propane, to which the container may be charged, is easily determined. Liquid levels from empty to full must be marked on the system nameplate or gauging device. Dials of magnetic or rotary gauges must show whether they are for cylindrical or spherical containers and whether for aboveground or underground service. The dials of gauges for aboveground

containers of over 1,200 gallons water capacity must be so marked.

(3) Gauging devices that require bleeding of the product to the atmosphere, such as the rotary tube, fixed tube, and slip tube, shall be designed so that the bleed valve maximum opening is not larger than a No. 54 drill size, unless provided with excess flow valve.

(4) Gauging devices must have a design working pressure of at least 250 psig.

(5) Length of tube or position of fixed liquid-level gauge must be designed to indicate the maximum level to which the container may be filled for the product contained. This level shall be based on the volume of the product at 40°F at its maximum permitted filling density for above-ground containers and at 50°F for underground containers. You must calculate the filling point for which the fixed liquid level gauge must be designed according to this section.

Note: It is impossible to set out in a table the length of a fixed dip tube for various tank capacities because of the various tank diameters and lengths, and because the tank may be installed either vertically or horizontally. If you know the maximum permitted filling volume in gallons, however, you can determine the length of the fixed tube by using a strapping table from the container manufacturer.

The fixed tube should be long enough so that when its lower end touches the surface of the liquid in the container, the contents of the container will be the maximum permitted volume as determined by the following formula:

$$\frac{\text{Water capacity of container}^1 \text{ (gals.)} \times \text{filling density}^2}{\text{Specific gravity of LP-gas}^1 \times \text{volume correction factor}^3 \times 100} = \frac{\text{Maximum volume of LP-gas}}{\text{Total water content of container in gallons}}$$

¹Measure at 60°F.

²From WAC 296-306A-41037(1).

³For aboveground containers the liquid temperature is assumed to be 40°F and for underground containers the liquid temperature is assumed to be 50°F. To correct the liquid volumes at these temperatures to 60°F, use the following factors:

(a) To determine maximum volume of LP-gas for which a fixed length of dip tube must be set:

TABLE U-6
VOLUME CORRECTION FACTORS

Specific gravity	Aboveground	Underground
0.500	1.033	1.017
.510	1.031	1.016
.520	1.029	1.015
.530	1.028	1.014
.540	1.026	1.013
.550	1.025	1.013
.560	1.024	1.012
.570	1.023	1.011
.580	1.021	1.011
.590	1.020	1.010

(b) To calculate the maximum volume of LP-gas that can be placed in a container when determining the length of the dip tube expressed as a percentage of total water content of the container, use the formula in (c) of this subsection.

(c) Determine the maximum weight of LP-gas that may be placed in a container for determining the length of a fixed

dip tube by multiplying the maximum volume of LP-gas from Table U-6 by the pounds of LP-gas in a gallon at 40°F for aboveground and at 50°F for underground containers. Typical pounds per gallon are specified below:

Example: Assume a one hundred gallon total water capacity tank for aboveground storage of propane having a specific gravity of 0.510 at 60°F.

$$\frac{100 \text{ (gals.)} \times 42 \text{ (filling density)}}{0.510 \times 1.031 \text{ (correction factor from Table U-6)} \times 100} = \frac{4200}{52.6}$$

4200 = 79.8 gallons propane, the maximum amount permitted to be placed in a 100-gallon total water capacity aboveground container equipped with a fixed dip tube.

$$\frac{\text{Maximum volume of LP-gas (from formula in (a) of this subsection)} \times 100}{\text{Total water content of container in gallons}} = \text{Maximum percent of LP-gas}$$

	Aboveground, pounds per gallon	Underground, pounds per gallon
Propane	4.37	4.31
N Butane	4.97	4.92

(6) Fixed liquid-level gauges used on non-DOT containers must be stamped on the exterior of the gauge with the letters DT followed by the vertical distance (expressed in inches and carried out to one decimal place) from the top of container to the end of the dip tube or to the centerline of the gauge when located at the maximum permitted filling level. For portable containers that may be filled in the horizontal and/or vertical position the letters DT must be followed by V with the vertical distance from the top of the container to the end of the dip tube for vertical filling, and with H followed by the proper distance for horizontal filling. For DOT containers the stamping must be placed both on the exterior of the gauge and on the container. On aboveground or cargo containers where the gauges are positioned at specific levels, the marking may be specified in percent of total tank contents and the marking must be stamped on the container.

(7) Columnar gauge glasses must be restricted to charging plants where the fuel is withdrawn in the liquid phase only. They must have valves with metallic handwheels, excess flow valves, and extra-heavy glass adequately protected with a metal housing applied by the gauge manufacturer. They must be shielded against the direct rays of the sun. Columnar gauge glasses are prohibited on tank trucks, motor fuel tanks, and containers used in domestic, commercial, and industrial installations.

(8) Float gauging devices or equivalent that do not require flow for their operation and that have connections extending outside the container do not have to have excess flow valves if the piping and fittings are adequately designed

to withstand the container pressure and are properly protected against physical damage and breakage.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-41049, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-41051 What requirements apply to appliances? (1) New commercial and industrial gas consuming appliances must be approved.

Exception: Any appliance that was originally manufactured for operation with a gaseous fuel other than LP-gas and is in good condition may be used with LP-gas only after it is properly converted, adapted, and tested for performance with LP-gas before the appliance is placed in use.

(2) Unattended heaters used inside buildings for the purpose of animal or poultry production or care must have an approved automatic device designed to shut off the flow of gas to the main burners, and pilot if used, in case the flame goes out.

(3) All commercial, industrial, and agricultural appliances or equipment must be installed according to the requirements of these standards and according to the following:

(a) Domestic and commercial appliances, NFPA 54-1969, Standard for the Installation of Gas Appliances and Gas Piping.

(b) Industrial appliances, NFPA 54A-1969, Standard for the Installation of Gas Piping and Gas Equipment on Industrial Premises and Certain Other Premises.

(c) Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines, NFPA 37-1970.

(d) Standard for the Installation of Equipment for the Removal of Smoke and Grease-Laden Vapors from Commercial Cooking Equipment, NFPA 96-1970.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-41051, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-415 Cylinder systems.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-415, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-41501 What does this section cover? WAC 296-306A-415 applies to systems using DOT containers. Cylinder systems must meet all requirements of WAC 296-306A-410 (unless otherwise indicated) and the additional requirements of this section.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-41501, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-41503 What is a "cylinder system?" A "cylinder system" includes the container base or bracket, containers, container valves, connectors, manifold valve assembly, regulators, and relief valves.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-41503, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-41505 How must containers be marked for cylinder systems? (1) Containers must be marked according to DOT regulations. Additional markings that do not conflict with DOT regulations may be used.

(2) Each container must be marked with its water capacity in pounds or other identified unit of weight.

(3) Exception: If you are the only one who fills and maintains the container and if the water capacity of the container is identified by a code, subsection (2) of this section does not apply.

(4) Each container must be marked with its tare weight in pounds or other identified unit of weight including all permanently attached fittings but not the cap.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-41505, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-41507 What additional requirements apply to cylinder systems installed outdoors? (1)

Containers must not be buried below ground. However, systems may be installed in a compartment or recess below grade level, such as a niche in a slope or terrace wall that is used for no other purpose, if the container and regulating equipment are not in contact with the ground, and the compartment or recess is drained and ventilated horizontally to the outside air from its lowest level, with the outlet at least 3 feet away from any building opening below the level of the outlet.

(2) Except as provided in WAC 296-306A-41025(14), the discharge from safety-relief devices must be located at least three feet away from any building opening that is below the level of discharge and must not terminate beneath any building unless the space is well ventilated to the outside and is not enclosed on more than two sides.

(3) Containers must be set on firm foundation or otherwise firmly secured; the possible effect of settling on the outlet piping must be guarded against by a flexible connection or special fitting.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-41507, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-41509 What additional requirements apply to cylinder system installed indoors? (1)

When portable containers are necessary and it is not practical to use them outdoors, containers and equipment may be used indoors only if they meet the requirements of this section.

(a) "Containers in use" means connected for use.

(b) Systems using containers with a water capacity greater than 2-1/2 pounds (nominal one pound LP-gas capacity) must have excess flow valves. Such excess flow valves must be either integral with the container valves or in the connections to the container valve outlets. In either case, an excess flow valve must be installed so that any strain beyond the excess flow valve will not cause breakage between the container and the excess flow valve. The installation of excess flow valves must take into account the type of valve protection provided.

(c) Regulators must be either directly connected to the container valves or to manifolds connected to the container valves. The regulator must be suitable for use with LP-gas. Manifolds and fittings connecting containers to pressure regulator inlets must be designed for at least 250 psig service pressure.

(d) Valves on containers having a water capacity greater than fifty pounds (nominal twenty pounds LP-gas capacity) must be protected while in use.

(e) Aluminum pipe or tubing is prohibited.

(f) Hose must be designed for a working pressure of at least 250 psig. Hose and hose connections shall be listed by a nationally recognized testing laboratory.

(i) Hose must be as short as practical.

(ii) Hose must be long enough to allow required spacing without kinking, straining, or allowing hose to be close enough to a burner to be damaged by heat.

(g) Portable heaters, including salamanders, must have an approved automatic device to shut off the flow of gas to the main burner, and pilot if used, in case the flame goes out. Heaters with inputs above 50,000 Btu manufactured on or after May 17, 1967, and heaters with inputs above 100,000 Btu manufactured before May 17, 1967, must have either:

(i) A pilot that must be lighted and proved before the main burner can be turned on; or

(ii) An electric ignition system;

(iii) Container valves, connectors, regulators, manifolds, piping, and tubing must not be used as structural supports for heaters.

Exception: These requirements do not apply to tar kettle burners, torches, melting pots, nor do they apply to portable heaters under 7,500 Btu input when used with containers with a maximum water capacity of 2-1/2 pounds.

(h) Containers, regulating equipment, manifolds, piping, tubing, and hose must be located to minimize exposure to abnormally high temperatures (such as may result from exposure to convection or radiation from heating equipment or installation in confined spaces), physical damage, or tampering.

(i) Heat producing equipment must be located and used to minimize the possibility of igniting combustibles.

(j) Containers with water capacity greater than 2-1/2 pounds (nominal one pound LP-gas capacity) connected for use, must stand on a firm and substantially level surface and, when necessary, must be secured in an upright position.

(k) Containers, including the valve protective devices, must be installed to minimize the probability of impingement of discharge of safety-relief devices upon containers.

(2) Containers with a maximum water capacity of 2-1/2 pounds (nominal one pound LP-gas capacity) may be used indoors as part of approved self-contained hand torch assemblies or similar appliances.

(3) When buildings frequented by the public are open to the public, containers may be used for repair or minor renovation as follows:

(a) The maximum water capacity of individual containers must be 50 pounds (nominal twenty pounds LP-gas capacity).

(b) The number of LP-gas containers must not exceed the number of employees assigned to use LP-gas.

(c) Containers with a water capacity greater than 2-1/2 pounds (nominal one pound LP-gas capacity) must be attended at all times.

(4) When buildings frequented by the public are closed to the public, containers may be used in buildings or structures for repairs or minor renovation as follows:

(a) The maximum water capacity of individual containers must be 245 pounds (nominal one hundred pounds LP-gas capacity).

(b) For temporary heating such as curing concrete, drying plaster and similar applications, heaters (other than integral heater-container units) must be located at least six feet from any LP-gas container. You may use heaters specifically designed for attachment to the container or to a supporting standard, if they are designed and installed to prevent direct or radiant heat application from the heater onto the container. Blower and radiant type heater must not be directed toward any LP-gas container within 20 feet.

(c) If two or more heater-container units are located in an unpartitioned area on the same floor, the container or containers of each unit must be separated from the container or containers of any other unit by at least 20 feet.

(d) When heaters are connected to containers for use in an unpartitioned area on the same floor, the total water capacity of containers manifolded together for connection to a heater or heaters shall not be greater than 735 pounds (nominal three hundred pounds LP-gas capacity). Such manifolds must be separated by at least 20 feet.

(e) On floors on which heaters are not connected for use, containers may be manifolded together for connection to a heater or heaters on another floor, if:

(i) The total water capacity of containers connected to any one manifold is a maximum of 2,450 pounds (nominal one thousand pounds LP-gas capacity) and;

(ii) Where more than one manifold having a total water capacity greater than 735 pounds (nominal three hundred pounds LP-gas capacity) are located in the same unpartitioned area, they shall be separated by at least 50 feet.

(f) Containers with a water capacity greater than 2-1/2 pounds (nominal one pound LP-gas capacity) must be attended at all times.

(5) Containers may be used in industrial occupancies for processing, research, or experimental purposes as follows:

(a) The maximum water capacity of individual containers must be 245 pounds (nominal one hundred pounds LP-gas capacity).

(b) Containers connected to a manifold must have a total water capacity of a maximum of 735 pounds (nominal three hundred pounds LP-gas capacity) and only one manifold may be located in the same room unless separated at least 20 feet from a similar unit.

(c) LP-gas in containers for research and experimental use must use the smallest practical quantity.

(6) Containers used in industrial occupancies with essentially noncombustible contents where portable equipment for space heating is essential and where a permanent heating installation is not practical, must meet the requirements of subsection (5) of this section.

(7) Containers may be used in buildings for temporary emergency heating purposes, if necessary to prevent damage to the buildings or contents, when the permanent heating system is temporarily out of service, as follows:

(a) Containers and heaters must meet the requirements of subsection (5) of this section.

(b) The temporary heating equipment must be attended at all times.

(8) Containers may be used temporarily in buildings for training purposes related in installation and use of LP-gas systems, as follows:

(a) The maximum water capacity of individual containers must be 245 pounds (nominal one hundred pounds LP-

gas capacity), but the maximum quantity of LP-gas that may be placed in each container is 20 pounds.

(b) If more than one container is located in the same room, the containers must be separated by at least 20 feet.

(c) Containers must be removed from the building when the training class has terminated.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-41509, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-41511 What requirements apply to valves and accessories? (1) Valves in the assembly of multiple container systems must be arranged so that containers can be replaced without shutting off the flow of gas in the system.

Note: An automatic changeover device is not required.

(2) Regulators and low-pressure relief devices must be rigidly attached to the cylinder valves, cylinders, supporting standards, the building walls or otherwise rigidly secured and must be installed or protected so that weather will not affect their operation.

(3) Valves and connections to the containers must be protected while in transit, in storage, and while being moved into final use, as follows:

(a) By setting into the recess of the container to prevent the possibility of being struck if the container is dropped on a flat surface; or

(b) By ventilated cap or collar, fastened to the container capable of withstanding a blow from any direction equivalent to that of a 30-pound weight dropped four feet. Construction must ensure that a blow will not be transmitted to the valve or other connection.

(4) When containers are not connected to the system, the outlet valves must be kept tightly closed or plugged, even on empty containers.

(5) Containers having a water capacity in excess of 50 pounds (approximately 21 pounds LP-gas capacity), recharged at the installation, must have excess flow or backflow check valves to prevent the discharge of container contents in case of failure of the filling or equalizing connection.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-41511, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-41513 What requirements apply to safety devices for cylinder systems? (1) Containers must have safety devices as required by DOT regulations.

(2) A final stage regulator of an LP-gas system (excluding any appliance regulator) must have, on the low-pressure side, a relief valve that is set to start to discharge within the limits specified in Table U-7.

TABLE U-7

Relief valve start-to-discharge pressure setting (percent of regulator delivery pressure)

Regulator delivery pressure	Minimum	Maximum
1 psig or less	200	300
Above 1 psig but not over 3 psig	140	200
Above 3 psig	125	200

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(3) When a regulator or pressure relief valve is used indoors for other than purposes specified in WAC 296-306A-41017(1), the relief valve and the space above the regulator and relief valve diaphragms shall be vented to the outside air with the discharge outlet located at least three feet horizontally away from any building opening that is below such discharge.

Exception: This requirement does not apply to individual appliance regulators when protection is otherwise provided, nor to WAC 296-306A-41509 and 296-306A-41025(14). In buildings devoted exclusively to gas distribution, the space above the diaphragm need not be vented to the outside.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-41513, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-41515 What other requirements apply to cylinder systems? (1) Containers must not be reinstalled unless they are requalified according to DOT regulations.

(2) A product must not be placed in a container marked with a service pressure less than four-fifths of the maximum vapor pressure of product at 130°F.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-41515, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-420 Systems using non-DOT containers.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-420, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-42001 What does this section cover? WAC 296-306A-420 applies to systems using storage containers not constructed according to DOT specifications. Non-DOT containers must meet all requirements of WAC 296-306A-410 (unless otherwise indicated) and the additional requirements of this section.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-42001, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-42003 How must non-DOT containers be designed and classified? Storage containers must be designed and classified according to Table U-8.

TABLE U-8

Container type	For gases with vapor press. Not to exceed lb. per sq. in. gauge 100°F (37.8°C.)	Minimum design pressures of container lb. per sq. in. gauge	
		1949 and earlier editions of ASME Code (Par. U-68, U-69)	1949 edition of Code (Par. U-200, U-201); 1950, 1952, 1956, 1959, 1962, 1965, and 1968 (Division I) editions of ASME Code; All editions of API-ASME Code ³
80 ¹	80 ¹	80 ¹	100 ¹
100	100	100	125
125	125	125	156
150	150	150	187

175	175	175	219
200 ²	215	200	250

¹New type 80 storage containers have not been authorized since Dec. 31, 1947.

²Container type may be increased by increments of 25. The minimum design pressure of containers shall be 100% of the container type designations when constructed under 1949 or earlier editions of the ASME Code (Par. U-68 and U-69). The minimum design pressure of containers shall be 125% of the container type designation when constructed under:

1. The 1949 ASME Code (Par. U-200 and U-201);
2. 1950, 1952, 1956, 1959, 1962, 1965, and 1968 (Division I) editions of the ASME Code; and
3. All editions of the API-ASME Code.

³Construction of containers under the API-ASME Code is prohibited after July 1, 1961.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-42003, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-42005 What requirements apply to valves and accessories, filler pipes, and discharge pipes for non-DOT containers? (1) The filling pipe inlet terminal must not be located inside a building. For containers with a water capacity of 125 gallons or more, such terminals must be located at least 10 feet from any building, and preferably at least 5 feet from any driveway, and must have a protective housing.

(2) The filling connection must be fitted with one of the following:

(a) Combination back-pressure check valve and excess flow valve.

(b) One double or two single back-pressure check valves.

(c) A positive shut-off valve in conjunction with either:

(i) An internal back pressure valve; or

(ii) An internal excess flow valve.

(3) All openings in a container must have approved automatic excess flow valves unless otherwise exempt.

(4) An excess flow valve is not required in the withdrawal service line if the following requirements are met:

(a) The total water capacity is a maximum of 2,000 U.S. gallons.

(b) The discharge from the service outlet is controlled by a manually operated shut-off valve that is:

(i) Threaded directly into the service outlet of the container; or

(ii) Is an integral part of a substantial fitting threaded into or on the service outlet of the container; or

(iii) Threaded directly into a substantial fitting threaded into or on the service outlet of the container.

(c) The shut-off valve is equipped with an attached handwheel or the equivalent.

(d) The controlling orifice between the contents of the container and the outlet of the shut-off valve is a maximum of 5/16 inch in diameter for vapor withdrawal systems and 1/8 inch in diameter for liquid withdrawal systems.

(e) An approved pressure-reducing regulator is directly attached to the outlet of the shut-off valve and is rigidly supported, or an approved pressure-reducing regulator is attached to the outlet of the shut-off valve by means of a suitable flexible connection, if the regulator is adequately supported and properly protected on or at the tank.

(5) All inlet and outlet connections except safety-relief valves, liquid-level gauging devices and pressure gauges on containers of 2,000 gallons water capacity, or more, and on any container used to supply fuel directly to an internal combustion engine, must be labeled to designate whether they communicate with vapor or liquid space. Labels may be on valves.

(6) Instead of an excess flow valve, openings may be fitted with a quick-closing internal valve that must remain closed when not in operation. The internal mechanism for such valves may have a secondary control that must have a fusible plug (not over 220°F melting point) that will cause the internal valve to close automatically in case of fire.

(7) A maximum of two plugged openings may be used on a container of 2,000 gallons or less water capacity.

(8) Containers of 125 gallons water capacity or more manufactured after July 1, 1961, must have an approved device for liquid evacuation, the size of which must be 3/4 inch national pipe thread minimum. A plugged opening does not satisfy this requirement.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-42005, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-42007 What additional requirements apply to safety devices for non-DOT containers?

(1) All safety devices must comply with the following:

(a) All container safety-relief devices must be located on the containers.

(b) In industrial and gas manufacturing plants, discharge pipe from safety-relief valves on pipe lines within a building must discharge upward and be piped to a point outside a building.

(c) Safety-relief device discharge terminals must be located to provide protection against physical damage and must be fitted with loose raincaps. Return bends and restrictive pipefittings are prohibited.

(d) If desired, discharge lines from two or more safety-relief devices located on the same unit, or similar lines from two or more different units, may be run into a common discharge header, if the cross-sectional area of the header is at least equal to the sum of the cross-sectional area of the individual discharge lines, and the setting of safety-relief valves are the same.

(e) Each storage container of over 2,000 gallons water capacity must have a suitable pressure gauge.

(f) A final stage regulator of an LP-gas system (excluding any appliance regulator) must have, on the low-pressure side, a relief valve that is set to start to discharge within the limits specified in Table U-7.

(g) When a regulator or pressure relief valve is installed indoors, the relief valve and the space above the regulator and relief valve diaphragms must be vented to the outside air with the discharge outlet located not less than 3 feet horizontally away from any opening into the building that is below such discharge.

Exception: This requirement does not apply to individual appliance regulators already protected. In buildings devoted exclusively to gas distribution, the space above the diaphragm need not be vented to the outside.

(2) Safety devices for aboveground containers must be provided as follows:

(a) Containers of 1,200 gallons water capacity or less that may contain liquid fuel when installed aboveground must have the rate of discharge required by WAC 296-306A-41025(2) provided by a spring-loaded relief valve or valves. In addition to the required spring-loaded relief valve, a suitable fuse plug may be used if the total discharge area of the fuse plug for each container does not exceed 0.25 square inch.

(b) The fusible metal of the fuse plugs must have a yield temperature of 208°F minimum and 220°F maximum. Relief valves and fuse plugs must have direct communication with the vapor space of the container.

(c) On a container having a water capacity between 125 and 2,000 gallons, the discharge from the safety-relief valves must be vented away from the container upwards and unobstructed to the open air so that it prevents any impingement of escaping gas upon the container; loose-fitting rain caps shall be used. Suitable provision must be made for draining condensate that may accumulate in the relief valve or its discharge pipe.

(d) On containers of 125 gallons water capacity or less, the discharge from safety-relief devices must be located at least 5 feet horizontally away from any opening into the building below the level of such discharge.

(e) On a container having a water capacity greater than 2,000 gallons, the discharge from the safety-relief valves must be vented away from the container upwards to a point at least 7 feet above the container, and unobstructed to the open air so that it prevents any impingement of escaping gas upon the container; loose-fitting rain caps shall be used. Suitable provision must be made so that any liquid or condensate that may accumulate inside of the safety-relief valve or its discharge pipe will not render the valve inoperative. If a drain is used, the container, adjacent containers, piping, or equipment must be protected against impingement of flame resulting from ignition of product escaping from the drain.

(3) On all containers that are installed underground and that contain no liquid fuel until buried and covered, the rate of discharge of the spring-loaded relief valve installed thereon may be reduced to a minimum of 30% of the rate of discharge specified in WAC 296-306A-41025(2). Containers so protected must remain covered after installation until the liquid fuel has been removed. Containers that may contain liquid fuel before being installed underground and before being completely covered with earth are aboveground containers when determining the rate of discharge requirement of the relief valves.

(4) On underground containers of over 2,000 gallons water capacity, the discharge from safety-relief devices must be piped directly upward to a point at least 7 feet above the ground.

(5) Where the manhole or housing may become flooded, the discharge from regulator vent lines must be above the highest probable water level. All manholes or housings must have ventilated louvers or equivalent, and the area of openings must be equal to or exceed the combined discharge areas of the safety-relief valves and other vent lines that discharge their content into the manhole housing.

(6) Safety devices for vaporizers must be provided as follows:

(a) Vaporizers of less than 1 quart total capacity, heated by the ground or the surrounding air, need not have safety-relief valves if adequate tests demonstrate that the assembly is safe without safety-relief valves.

(b) Fusible plugs are prohibited on vaporizers.

(c) In industrial and gas manufacturing plants, safety-relief valves on vaporizers within a building must be piped to a point outside the building and be discharged upward.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-42007, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-42009 When may non-DOT containers be reinstalled? Containers may be reinstalled if they are free from harmful external corrosion or other damage. Where containers are reinstalled underground, the corrosion resistant coating must be put in good condition. Where containers are reinstalled aboveground, the safety devices and gauging devices must meet all requirements for aboveground containers.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-42009, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-42011 What is the maximum capacity allowed for non-DOT containers? A non-DOT storage container must have a maximum 90,000 gallons water capacity.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-42011, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-42013 How must non-DOT containers be installed? (1) Containers installed aboveground must have substantial masonry or noncombustible structural supports on firm masonry foundation, unless otherwise indicated.

(2) Aboveground containers must be supported as follows:

(a) Horizontal containers must be mounted on saddles that permit expansion and contraction. Structural metal supports may be used when they are protected against fire. Suitable means of preventing corrosion must be provided on that portion of the container in contact with the foundations or saddles.

(b) Containers of 2,000 gallons water capacity or less may be installed with nonfireproofed ferrous metal supports if mounted on concrete pads or footings, and if the distance from the outside bottom of the container shell to the concrete pad, footing, or the ground is a maximum of 24 inches.

(3) Any container may be installed with nonfireproofed ferrous metal supports if mounted on concrete pads or footings, and if the distance from the outside bottom of the container to the ground is a maximum of 5 feet, if the container is in an isolated location.

(4) Partially buried containers must meet the following requirements:

(a) The portion of the container below the surface and for a vertical distance not less than 3 inches above the surface of the ground is protected to resist corrosion, and the container is protected against settling and corrosion as required for fully buried containers.

(b) Partially buried containers must meet the same spacing requirements as underground tanks.

(c) Relief valve capacity must be the same as for aboveground containers.

(d) Container is protected against vehicular damage by location or other means.

(e) Partially buried containers must meet the same requirements for filling densities as for aboveground containers.

(5) Containers buried underground must be placed so that the top of the container is at least 6 inches below grade. Underground containers subject to abrasive action or physical damage must be:

(a) Placed not less than 2 feet below grade; or

(b) Otherwise protected against such physical damage.

It is not necessary to cover the portion of the container to which manhole and other connections are affixed. When necessary to prevent floating, containers must be securely anchored or weighted.

(6) Containers must be given a protective coating before being placed underground. This coating must be equivalent to hot-dip galvanizing or to two coatings of red lead followed by a heavy coating of coal tar or asphalt. In lowering the container into place, take care to prevent damage to the coating. Any damage to the coating must be repaired before backfilling.

Containers must be set on a firm foundation (firm earth may be used) and surrounded with earth or sand firmly tamped in place. Backfill should be free of rocks or other abrasive materials.

(7) Containers with foundations attached (portable or semiportable containers with suitable steel runners or skids popularly known as "skid tanks") must meet the requirements of WAC 296-306A-410 and the following:

(a) If they are to be used at a given general location for a temporary period of 6 months at most, they may be without fire-resisting foundations or saddles but must have adequate ferrous metal supports.

(b) They must not be located with the outside bottom of the container shell more than 5 feet above the surface of the ground unless fire-resisting supports are provided.

(c) The bottom of the skids must be between 2 and 12 inches below the outside bottom of the container shell.

(d) Flanges, nozzles, valves, fittings, and the like, having communication with the interior of the container, must be protected against physical damage.

(e) When not permanently located on fire-resisting foundations, piping connections must be flexible enough to minimize breakage or leakage of connections if the container settles, moves, or is otherwise displaced.

(f) Skids, or lugs for attachment of skids, must be secured to the container according to the rules under which the container is designed and built (with a minimum factor of safety of four) to withstand loading in any direction equal to four times the weight of the container and attachments when filled to the maximum permissible loaded weight.

(8) Field welding where necessary must be made only on saddle plates or brackets that were applied by the manufacturer of the tank.

(9) For aboveground containers, secure anchorage or adequate pier height must be provided against possible container flotation wherever high floodwater might occur.

(10) When permanently installed containers are interconnected, you must allow for expansion, contraction, vibration,

and settling of containers, and interconnecting piping. Where flexible connections are used, they must be approved and designed for a bursting pressure of at least five times the vapor pressure of the product at 100°F. Nonmetallic hose is prohibited for permanently interconnecting containers.

(11) Container assemblies listed for interchangeable installation aboveground or underground must meet the requirements for aboveground installations for safety-relief capacity and filling density. For installation aboveground all other requirements for aboveground installations apply. For installation underground all other requirements for underground installations apply.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-42013, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-42015 How must non-DOT containers be protected? (1) Valves, regulating, gauging, and other container accessory equipment must be protected against tampering and physical damage. Such accessories must also be protected during the transit of containers intended for installation underground.

(2) On underground or combination aboveground-underground containers, the service valve handwheel, the terminal for connecting the hose, and the opening through which there can be a flow from safety-relief valves must be at least 4 inches above the container and this opening must be located in the dome or housing. Underground systems must be installed so that all openings, including the regulator vent, are located above the normal maximum water table.

(3) All connections to the underground containers must be located within a substantial dome, housing, or manhole, with access protected by a substantial cover.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-42015, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-42017 What requirements apply to non-DOT containers in industrial plants? General provisions applicable to systems in industrial plants (of 2,000 gallons water capacity and more) and to bulk filling plants.

(1) When standard watch service is provided, it must be extended to the LP-gas installation and personnel shall be properly trained.

(2) If loading and unloading are normally done during the night, adequate lights must be provided to illuminate storage containers, control valves, and other equipment.

(3) Suitable roadways or means of access for extinguishing equipment such as wheeled extinguishers or fire department apparatus must be provided.

(4) To minimize trespassing or tampering, the area that includes container accessories, pumping equipment, loading and unloading facilities, and cylinder-filling facilities must be enclosed with at least a 6-foot-high industrial fence unless otherwise adequately protected. There must be at least two means of emergency access.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-42017, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-42019 What requirements apply to container-charging plants? (1) The container-charging room must be located at least:

(a) Ten feet from bulk storage containers.

(b) Twenty-five feet from line of adjoining property that may be built on.

(2) Tank truck filling station outlets must be located at least:

(a) Twenty-five feet from line of adjoining property that may be built on.

(b) Ten feet from pumps and compressors if housed in one or more separate buildings.

(3) The pumps or compressors may be located in the container-charging room or building, in a separate building, or outside of buildings. When housed in separate building, such building (a small noncombustible weather cover is not to be construed as a building) must be located at least:

(a) Ten feet from bulk storage tanks.

(b) Twenty-five feet from line of adjoining property that may be built on.

(c) Twenty-five feet from sources of ignition.

(4) When a part of the container-charging building is to be used for a boiler room or where open flames or similar sources of ignition exist or are employed, the space to be occupied must be separated from container charging room by a partition wall or walls of fire-resistant construction continuous from floor to roof or ceiling. Such separation walls must be without openings and must be joined to the floor, other walls, and ceiling or roof to provide a permanent gas-tight joint.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-42019, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-42021 What fire protection must be provided for non-DOT containers? (1) Each bulk plant must have at least one approved portable fire extinguisher with a minimum rating of 12-B, C.

(2) In industrial installations involving containers of 150,000 gallons aggregate water capacity or more, you must provide an adequate supply of water at the container site for fire protection in the container area, unless other adequate means for fire control are provided. Water hydrants must be readily accessible and spaced to provide water protection for all containers. Enough firehose must be provided to facilitate easy movement of the hose in the container area. You should equip the outlet of each hose line with a combination fog nozzle. A shelter must be provided to protect the hose and its conveyor from the weather.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-42021, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-42023 What other requirements apply to non-DOT containers? (1) Aboveground containers must be kept properly painted.

(2) Vaporizers for internal combustion engines must meet the requirements of WAC 296-306A-42515.

(3) Gas regulating and mixing equipment for internal combustion engines must meet the requirements of WAC 296-306A-42517.

(4) Where vaporized gas on the low-pressure side of the system may condense to a liquid at normal operating temperatures and pressures, means must be provided to revaporize condensate.

(5) You must protect LP-gas systems against damage from vehicular traffic.

(6) Avoid the use of pits when possible, except pits fitted with automatic flammable vapor detecting devices. No drains or blowoff lines must be directed into or in proximity to sewer systems used for other purposes.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-42023, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-425 LP-gas as a motor fuel.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-425, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-42501 What does this section cover? (1) WAC 296-306A-425 applies to internal combustion engines, fuel containers, and pertinent equipment for the use of LP-gases as a motor fuel on easily movable, readily portable units including self-propelled vehicles. This section does not apply to containers for transportation of LP-gases nor to marine fuel use.

(2) All uses of LP-gas as a motor fuel must meet all requirements of WAC 296-306A-410 (unless otherwise indicated) and the additional requirements of this section.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-42501, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-42503 What general requirements apply to LP-gas used as a motor fuel? (1) Fuel may be used from the cargo tank of a truck while in transit, but not from cargo tanks on trailers or semitrailers. Fuel may be used from the cargo tanks to operate stationary engines if the wheels are securely blocked.

(2) Passenger-carrying vehicles must not be fueled while passengers are on board.

(3) Industrial trucks (including lift trucks) equipped with permanently mounted fuel containers must be charged outdoors. Charging equipment must meet the requirements of WAC 296-306A-440.

(4) LP-gas fueled industrial trucks must comply with the Standard for Type Designations, Areas of Use, Maintenance and Operation of Powered Industrial Trucks, NFPA 505-1969.

(5) Engines on vehicles must be shut down while fueling if the fueling operation involves venting to the atmosphere.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-42503, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-42505 How must fuel containers be designed and classified? (1) Containers must meet the following requirements:

Minimum design pressure of container lb. per sq. in. gauge

Container type	For gases with vapor press. Not to exceed lb. per sq. in. gauge at 100°F (37.8°C.)	1949 and earlier editions of ASME Code (Par. U-68, U-69)	1949 edition of ASME Code (Par. U-200, U-201); editions 1950, 1952, 1956, 1959, 1962, 1965, and 1968 (Division I) editions of ASME Code; All editions of API-ASME Code ²
	200 ¹	215	200
			250

¹Container type may be increased by increments of 25. The minimum design pressure of containers shall be 100% of the container type designation when constructed under 1949 or earlier editions of the ASME Code (Par. U-68 and U-69). The minimum design pressure of containers shall be 125% of the container type designation when constructed under:

1. The 1949 ASME Code (Par. U-200 and U-201);
2. 1950, 1952, 1956, 1959, 1962, 1965, and 1968 (Division I) editions of the ASME Code; and
3. All editions of the API-ASME Code.

²Construction of containers under the API-ASME Code is prohibited after July 1, 1961.

Exception: Fuel containers for use in industrial trucks (including lift trucks) shall be either DOT containers authorized for LP-gas service having a minimum service pressure of 240 psig or minimum Container Type 250. Under 1950 and later ASME Codes, this means a 312.5-psig design pressure container.

(2) DOT containers used as fuel containers must meet all requirements of this section.

(3) All container inlets and outlets except safety-relief valves and gauging devices must be labeled to designate whether they communicate with vapor or liquid space. (Labels may be on valves.)

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-42505, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-42507 How must fuel containers be installed? (1) Containers must be located to minimize the possibility of damage to the container. Containers located in the rear of trucks and buses, when protected by substantial bumpers meet this requirement. Fuel containers on passenger-carrying vehicles must be installed as far from the engine as is practical, and the passenger space and any space containing radio equipment must be sealed from the container space to prevent direct seepage of gas to these spaces. The container compartment must be vented to the outside. In case the fuel container is mounted near the engine or the exhaust system, the container must be shielded against direct heat radiation.

(2) Containers must be installed with as much clearance as practical and at least the minimum road clearance of the vehicle under maximum spring deflection. This minimum clearance must be to the bottom of the container or to the lowest fitting on the container or housing, whichever is lower.

(3) Permanent and removable fuel containers must be securely mounted to prevent jarring loose, slipping, or rotating, and the fastenings must be designed and constructed to withstand static loading in any direction equal to twice the weight of the tank and attachments when filled with fuel

using a safety factor of at least four based on the ultimate strength of the material to be used. Field welding, when necessary, must be made only on saddle plates, lugs or brackets, attached to the container by the manufacturer.

(4) Fuel containers on buses must be permanently installed.

(5) Containers from which only vapor is to be withdrawn must be installed and equipped with suitable connections to minimize the accidental withdrawal of liquid.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-42507, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-42509 What requirements apply to valves and accessories? (1) Container valves and accessories must have a rated working pressure of at least 250 psig, and must be suitable for LP-gas service.

(2) The filling connection must be fitted with an approved double back-pressure check valve, or a positive shut off in conjunction with an internal back-pressure check valve. On a removable container the filler valve may be a hand operated shut-off valve with an internal excess flow valve. Main shut-off valves on the container on liquid and vapor must be readily accessible.

(3) Filling connections equipped with approved automatic back-pressure check valves, and safety-relief valves, all connections to the containers having openings for the flow of gas in excess of a No. 54 drill size must have approved automatic excess flow valves to prevent discharge of content in case connections are broken.

(4) Liquid-level gauging devices must meet the following requirements:

(a) Variable liquid-level gauges that require the venting of fuel to the atmosphere are prohibited on fuel containers of industrial trucks (including lift trucks).

(b) On portable containers that may be filled in the vertical and/or horizontal position, the fixed liquid-level gauge must indicate maximum permitted filling level for both vertical and horizontal filling with the container oriented to place the safety-relief valve in communication with the vapor space.

(c) For containers used solely in farm tractor service and charged at a point at least 50 feet from any important building, the fixed liquid-level gauging device may be constructed so that the outward flow of container content exceeds that passed by a No. 54 drill size opening, but must never exceed that passed by a No. 31 drill-size opening. An excess flow valve is not required. Fittings equipped with restricted drill size opening and the container on which they are used must be marked to indicate the size of the opening.

(d) All valves and connections on containers must be adequately protected to prevent damage due to accidental contact with stationary objects or from loose objects thrown up from the road. All valves must be safeguarded against damage due to collision, overturning or other accident. Farm tractors where parts of the vehicle provide protection to valves and fittings meet this requirement. However, on removable type containers the protection for the fittings must be permanently attached to the container.

(e) You should normally exchange removable fuel outdoors. When removable fuel containers are used, means shall be provided in the fuel system to minimize the escape

of fuel when the containers are exchanged. You must use one of the following methods:

(i) Using an approved automatic quick-closing coupling (a type closing in both directions when uncoupled) in the fuel line; or

(ii) Closing the valve at the fuel container and allowing the engine to run until the fuel in the line is consumed.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-42509, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-42511 What requirements apply to piping, tubing, and fittings? (1) Pipe from fuel container to first-stage regulator must be at least schedule 80 wrought iron or steel (black or galvanized), brass or copper; or seamless copper, brass, or steel tubing. Steel tubing must have a minimum wall thickness of 0.049 inch. Steel pipe or tubing must be adequately protected against exterior corrosion. Copper tubing must be types K or L or equivalent with a minimum wall thickness of 0.032 inch. Approved flexible connections may be used between container and regulator or between regulator and gas-air mixer. Using aluminum pipe or tubing is prohibited. For removable containers, an approved flexible connection must be used between the container and the fuel line.

(2) All piping must be installed, braced, and supported to minimize vibration strains or wear.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-42511, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-42513 What requirements apply to safety devices? (1) Spring-loaded internal safety-relief valves must be used on all motor fuel containers.

(2) The discharge outlet from safety-relief valves must be located on the outside of enclosed spaces and as far as practical from possible sources of ignition, and vented upward within 45 degrees of the vertical to prevent impingement of escaping gas upon containers, or parts of vehicles, or on vehicles in adjacent lines of traffic. A rain cap or other protector must be used to keep water and dirt from collecting in the valve.

(3) When a discharge line from the container safety-relief valve is used, the line shall be metallic, other than aluminum, and must be sized, located, and maintained so as not to restrict the required flow of gas from the safety-relief valve. The discharge line must be able to withstand the pressure resulting from the discharge of vapor when the safety-relief valve is in the full open position. Flexible metal hose or tubing must be used when necessary.

(4) Portable containers equipped for volumetric filling may be filled in either the vertical or horizontal position only when oriented to place the safety-relief valve in communication with the vapor space.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-42513, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-42515 What requirements apply to vaporizers? (1) Vaporizers, their parts, and other devices that may be subjected to container pressure must have a design pressure of at least 250 psig.

(2) Each vaporizer must have a valve or suitable plug that will permit substantially complete draining of the

vaporizer. It must be located at or near the lowest portion of the section occupied by the water or other heating medium.

(3) Vaporizers must be securely fastened to minimize the possibility of loosening.

(4) Each vaporizer must be permanently marked at a visible point as follows:

(a) With the design pressure of the fuel-containing portion in psig.

(b) With the water capacity of the fuel-containing portion of the vaporizer in pounds.

(5) Devices to supply heat directly to a fuel container must have an automatic device to cut off the supply of heat before the pressure inside the fuel container reaches 80% of the start-to-discharge pressure setting of the safety-relief device on the fuel container.

(6) Engine exhaust gases may be used as a direct source of heat supply for the vaporization of fuel if the materials of construction of those parts of the vaporizer in contact with exhaust gases are resistant to the corrosive action of exhaust gases and the vaporizer system is designed to prevent excessive pressures.

(7) Fusible plugs are prohibited on vaporizers.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-42515, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-42517 What requirements apply to gas regulating and mixing equipment? (1) Approved automatic pressure reducing equipment must be installed securely between the fuel supply container and gas-air mixer to reduce the pressure of the fuel delivered to the gas-air mixer.

(2) An approved automatic shut-off valve must be provided in the fuel system at some point ahead of the inlet of the gas-air mixer, designed to prevent flow of fuel to the mixer when the ignition is off and the engine is not running. For industrial trucks and engines operating in buildings other than those used exclusively to house engines, the automatic shut-off valve must be designed to operate if the engine stops. Atmospheric regulators (zero governors) are adequate as an automatic shut-off valve only in cases of outdoor operation such as farm tractors, construction equipment, irrigation pump engines, and other outdoor stationary engine installations.

(3) The source of air for combustion must be completely isolated from the passenger compartment, ventilating system, or air-conditioning system.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-42517, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-42519 What is the maximum container capacity allowed? A single fuel container used on passenger carrying vehicles must have a maximum of 200 gallons water capacity. A single fuel container on other vehicles normally operating on the highway must have a maximum of 300 gallons water capacity except as provided in WAC 296-306A-42503(1).

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-42519, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-42521 What requirements apply to stationary engines used indoors? Stationary engines and gas turbines installed in buildings, including portable engines used instead of or to supplement stationary engines, must comply with the Standard for the Institution and Use of Stationary Combustion Engines and Gas Turbines, NFPA 37-1970, and the appropriate requirements of WAC 296-306A-410 through 296-306A-420.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-42521, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-42523 What requirements apply to portable engines used indoors? (1) Portable engines may be used in buildings only for emergency use, and according to WAC 296-306A-42521.

(2) Exhaust gases must be discharged outside the building or to an area where they will not constitute a hazard.

(3) Provision must be made to supply sufficient air for combustion and cooling.

(4) An approved automatic shut-off valve must be provided in the fuel system ahead of the engine, designed to prevent flow of fuel to the engine when the ignition is off or if the engine should stop.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-42523, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-42525 What requirements apply to industrial trucks used indoors? (1) LP-gas-fueled industrial trucks may be used in buildings and structures.

(2) No more than two LP-gas containers must be used on an industrial truck for motor fuel purposes.

(3) LP-gas-fueled industrial trucks may be used in buildings frequented by the public, when occupied by the public. The total water capacity of containers on each industrial truck must be a maximum of 105 pounds (nominal 45 pounds LP-gas).

(4) Trucks must be attended at all times in areas occupied by the public.

(5) Industrial trucks must not be parked and left unattended in areas of possible excessive heat or sources of ignition.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-42525, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-42527 How must LP-gas-fueled vehicles be garaged? (1) LP-gas-fueled vehicles may be stored or serviced inside garages if there are no leaks in the fuel system and the fuel tanks are not filled beyond the maximum filling capacity allowed.

(2) LP-gas-fueled vehicles being repaired in garages must have the container shut-off valve closed except when fuel is required for engine operation.

(3) Such vehicles must not be parked near sources of heat, open flames, or similar sources of ignition or near open pits unless such pits are adequately ventilated.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-42527, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-430 Storage of containers awaiting use or resale.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-430, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-43001 What does this section cover? WAC 296-306A-430 applies to the storage of portable containers a maximum of 1,000 pounds water capacity, filled or partially filled, at user location but not connected for use, or in storage for resale by dealers or resellers. This section does not apply to containers stored at charging plants or at plants devoted primarily to the storage and distribution of LP-gas or other petroleum products.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-43001, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-43003 What general requirements apply to storage of containers? (1) Containers in storage must be located to minimize exposure to excessive temperature rise, physical damage, or tampering.

(2) Containers stored inside must be located away from exits, stairways, or in areas normally used or intended for the safe exit of people.

(3) Container valves must be protected while in storage as follows:

(a) By setting into recess of container to prevent the possibility of their being struck if the container is dropped upon a flat surface; or

(b) By ventilated cap or collar, fastened to container capable of withstanding blow from any direction equivalent to that of a thirty-pound weight dropped four feet. Construction must be such that a blow will not be transmitted to a valve or other connection.

(4) The outlet valves of containers in storage must be closed.

(5) Empty containers that have been in LP-gas service should preferably be stored in the open. When stored inside, they must be considered full containers for the purpose of determining the maximum quantity of LP-gas permitted by this section.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-43003, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-43005 How must containers be stored within buildings frequented by the public? DOT containers with a maximum individual water capacity of 2-1/2 pounds, used with completely self-contained hand torches and similar applications, may be stored or displayed in a building frequented by the public. The display of such containers must be limited to a total of 24 units of each brand and size. The total quantity on display and in storage must not exceed 200 pounds LP-gas.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-43005, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-43007 How must containers be stored in buildings not frequented by the public? (1) The quantity of LP-gas stored must be a maximum of 300

pounds (approximately 2,550 cubic feet in vapor form), except when stored within special buildings or rooms.

(2) Containers carried as a part of service equipment on highway mobile vehicles are not considered in the total storage capacity if the vehicles are stored in private garages, and are limited to one container per vehicle with a maximum LP-gas capacity of 100 pounds. All container valves must be closed.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-43007, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-43009 How must containers be stored within special buildings or rooms? (1) The quantity of LP-gas stored in special buildings or rooms must be a maximum of 10,000 pounds.

(2) The walls, floors, and ceilings of container storage rooms that are within or adjacent to other parts of the building must be constructed of material having at least a two-hour fire resistance rating.

(3) At least 10% of the exterior walls or roof must be of explosion relieving construction.

(4) Each opening from storage rooms to other parts of the building must be protected by a listed one and one-half hour "(B)" fire door.

(5) Such rooms must have no open flames for heating or lighting.

(6) Such rooms must be adequately ventilated both top and bottom to the outside only. The openings from such vents must be at least five feet away from any other opening into any building.

(7) The floors of such rooms must not be below ground level. Any space below the floor must be of solid fill or properly ventilated to the open air.

(8) Such storage rooms must not be located adjoining the line of property occupied by schools, churches, hospitals, athletic fields or other points of public gathering.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-43009, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-43011 How must containers be stored outdoors? (1) Storage outside of buildings, for containers awaiting use or resale, must be located according to the table below with respect to:

- (a) The nearest important building or group of buildings;
- (b) The line of adjoining property that may be built on;
- (c) Busy thoroughfares;
- (d) The line of adjoining property occupied by schools, churches, hospitals, athletic fields, or other points of public gathering.

Quantity of LP-Gas Stored	Distance
500 pounds or less	0
501 to 2,500 pounds	0*
2,501 to 6,000 pounds	10 feet
6,001 to 10,000 pounds	20 feet
Over 10,000 pounds	25 feet

*Containers must be at least ten feet from any building on adjoining property, any sidewalk, or any of the exposures described in (c) or (d) of this subsection.

(2) Containers must be in a suitable enclosure or otherwise protected against tampering.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-43011, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-43013 What fire protection must be provided for stored containers? Storage locations other than supply depots separated and located apart from dealer, reseller, or user establishments must have at least one approved portable fire extinguisher having a minimum rating of 8-B, C.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-43013, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-435 LP-gas system installations on commercial vehicles.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-435, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-43501 What does this section cover? (1) WAC 296-306A-435 applies to:

(a) LP-gas system installations on vehicles (self-propelled, trailers, or semitrailers) used for commercial or construction purposes;

(b) All exchangeable container systems with container capacities greater than 105 pounds water capacity (approximately 45 pounds LP-gas capacity); and

(c) Systems using containers permanently mounted on vehicles.

(2) All LP-gas installations on commercial vehicles must meet all requirements of WAC 296-306A-410 (unless otherwise indicated) and the additional requirements of this section. When such a vehicle is permanently parked, and LP-gas is supplied from a system not mounted on and secured to the unit, WAC 296-306A-415 and 296-306A-420 also apply.

(3) This section does not apply to LP-gas motor fuel systems covered by WAC 296-306A-425.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-43501, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-43503 How must containers be constructed? Containers must be constructed according to WAC 296-306A-41011, and marked according to the applicable requirements of WAC 296-306A-41015, and must also meet the following:

(1) Containers designed for use as portable cylinders must be constructed according to DOT specifications.

(2) All other containers whether designed for permanent mounting, or for portable or semiportable use (such as skid tanks), must be constructed as provided for by WAC 296-306A-41009(4) and 296-306A-41011(1).

(3) Nonrecessed container fittings and accessories must be protected against damage by either:

- (a) Their location;
- (b) The vehicle frame or bumper; or
- (c) Protective housing. The housing must meet the requirements under which the tanks are fabricated with respect to design and construction and must be designed to

withstand static loading in any direction equal to twice the weight of the tank and attachments when filled with the lading at a safety factor of at least four, based on the ultimate strength of the material used. The housing must have a weather cover if necessary to ensure proper operation of valves and safety devices.

(4) Manually operated shut-off valves or self-closing internal valves must be closed except during transfer operations.

(5) Permanently installed containers must meet the following requirements:

(a) Tank motor vehicles with frames not made integral with the tank, as by welding, must have turnbuckles or similar positive devices for drawing the tank down tight on the frame. In addition, suitable stops or anchors must be attached to the frame and/or the tank to prevent relative motion between them from starting, stopping, and turning. The stops and anchors must be installed to be accessible for inspection and maintenance.

(b) Any tank motor vehicle designed and constructed so that the cargo tank constitutes the stress member used instead of a frame must be supported by external cradles enclosing at least 120 degrees of the shell circumference. The design calculations must include beam stress, shear stress, torsion stress, bending moment, and acceleration stress for the cargo tank as a whole using a factor of safety of four, based on the ultimate tensile strength of the material. Maximum concentrated stresses that might be created at pads and cradles due to shear, bending, and torsion shall also be calculated according to Appendix G of the American Society of Mechanical Engineers, Unfired Pressure Vessel Code, 1968. Fully loaded vehicles must be assumed to be operating under highway conditions equal to two "g" loading. The effects of fatigue shall be taken into consideration. Cargo tanks mounted on frames may be supported by upright supports attached to pads if these factors are taken into account.

(c) Where any tank support is attached to any part of a tank head, the stresses imposed upon the head must be provided for as required above.

(d) Tank supports, stops, anchors, and bumpers must not be welded directly to the tank but must be attached by means of pads of the same material as the tank. The pad thickness must be at least 1/4 inch, or the thickness of the shell material if less, and no greater than the shell material. Each pad must extend at least four times its thickness, in each direction, beyond the weld attaching the support, bumper, stop, or anchor. Each pad must be preformed to an inside radius no greater than the outside radius of the tank at the place of attachment. Each pad corner must be rounded to a radius at least one-fourth the width of the pad, and no greater than one-half the width of the pad. Weepholes and tell-tale holes, if used, must be drilled or punched before the pads are attached to the tank. Each pad must be attached to the tank by continuous fillet welding using filler material having properties that meet the recommendations of the maker of the shell and head material.

(6) Portable or semiportable containers must meet the applicable requirements of WAC 296-306A-42507(3). Containers designed for permanent installation as part of systems under WAC 296-306A-420 are prohibited.

(a) Filling connections must have an approved automatic back pressure check valve, excess flow check valve, or quick closing internal valve to prevent excessive escape of gas in case the filling connection is broken.

Exception: Where the filling and discharge connect on a common opening in the container shell, and the opening is fitted with a quick-closing internal valve, the automatic valve is not required.

Every inlet and outlet connection must have a manually or automatically operated shut-off valve. Liquid discharge openings, except those for engine fuel lines, on tanks built after September 1, 1965, must be fitted with a remotely controlled internal shut-off valve. Valves must meet the following requirements:

(i) The seat of the valve must be inside the tank, or in the opening nozzle or flange, or in a companion flange bolted to the nozzle or flange.

(ii) All parts of the valve inside the tank, nozzle, or companion flange must be made of material that protects against corrosion or other deterioration in the presence of the lading.

(iii) The parts must be arranged so that damage to parts exterior to the tank will not prevent effective seating of the valve.

(iv) The valve may be operated mechanically, by hydraulically, or by air, or gas pressure.

(v) The valve must have remote means of automatic closure, both mechanical and thermal, in at least two places for tanks over 3,500 gallons water capacity. These remote control stations must be located at each end of the tank and diagonally opposite. The thermal control mechanism must have a fusible element with a melting point between 220°F and 208°F. At least one remote control station must be provided for tanks of 3,500 gallons water capacity or less, and such actuating means may be mechanical.

(b) All other connections to containers, except those used for gauging devices, thermometer wells, safety-relief devices, and plugged openings, must have suitable automatic excess flow valves, or may instead be fitted with quick-closing internal valves.

The control mechanism for the internal valve must have a secondary control, remote from the fill or discharge connections (for use in the event of accidents or fire during delivery operations), and such control mechanism must have a fusible element with a melting point not over 220°F or less than 208°F.

(c) Excess flow valves must close automatically at the rated flow of vapor or liquid as specified by the valve manufacturers. The flow rating of the piping beyond the excess flow valve must be greater than that of the excess flow valve and such rating must include valves, fittings, and hose.

Exception: When branching or necessary restrictions are incorporated in a piping system so that flow ratings are less than that of the excess flow valve and the tank, then additional excess flow valves must be installed in the piping where such flow rate is reduced.

(d) Container inlets and outlets, except those used for safety-relief valves, liquid-level gauging devices, and pressure gauges, must be labeled to designate whether they communicate with vapor or liquid space when the container

is filled to maximum permitted filling density. Labels may be on the valves.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-43503, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-43505 What is the maximum capacity allowed for LP-gas installations on commercial vehicles? A single fuel container used on passenger carrying vehicles must not exceed 200 gallons water capacity.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-43505, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-43507 Where must systems be located? (1) Containers must not be installed, transported, or stored (even temporarily) inside any vehicle covered by these standards except as provided by the DOT regulations.

(2) Containers, control valves, and regulating equipment comprising a complete system must be suitably protected against damage and weather. Systems may be installed in a recess vaportight to the inside of the vehicle and accessible from and vented to the outside.

(3) Systems installed outside of mobile units must be located so that discharge from safety-relief devices must be at least 3 feet horizontally away from any opening into the unit below the level of such discharge. When the system is located in a recess vaportight to the inside, vent openings in the recess must be at least 3 feet horizontally away from any opening into the mobile unit below the level of these vents.

(4) There must be no fuel connection between tractor and trailer or other vehicle units.

(5) The container or container carrier must be secured in place by fastenings designed and constructed with a minimum safety factor of four to withstand loading in any direction equal to twice the weight of the container when filled to normal capacity with LP-gas.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-43507, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-43509 What requirements apply to valves and accessories? Container valves and accessories must be provided, protected and mounted as follows:

(1) Systems using DOT cylinders according to WAC 296-306A-41511.

(2) All other systems according to WAC 296-306A-42005 (2) through (8).

(3) Portable, semiportable and permanently mounted containers shall be mounted and protected as provided under WAC 296-306A-43503 (2), (5), and (6).

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-43509, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-43511 What requirements apply to safety devices? (1) DOT containers must have safety-relief devices as required by DOT regulations.

(2) A final stage regulator of an LP-gas system (excluding any appliance regulator) must have, on the low-pressure side, a relief valve that is set to start to discharge within the limits specified in Table U-7.

(3) The relief valve and space above the regulator and relief valve diaphragms must be vented to the outside air and terminate at a position to minimize the possibility of vapors accumulating at sources of ignition.

(4) Whenever equipment such as a cargo heater or cooler on commercial vehicles is designed to be in operation while in transit, suitable means to stop the flow such as an excess flow valve or other device, must be installed. This device will be actuated to stop the flow in the event of the break in the fuel supply line. All excess flow valves must comply with WAC 296-306A-41019(3).

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-43511, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-43513 What types of systems may be used on commercial vehicles? Commercial vehicles must use either vapor withdrawal or liquid withdrawal systems.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-43513, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-43515 What requirements apply to enclosures and mounting? (1) Housing or enclosures must be designed to provide proper ventilation.

(2) Hoods, domes, or removable portions of cabinets must have means to keep them firmly in place during transit.

(3) The assembly must hold the containers firmly in position and prevent their movement during transit according to WAC 296-306A-42507(3).

(4) Containers must be mounted on a substantial support or base secured firmly to the vehicle chassis. Neither the container nor its support must extend below the frame.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-43515, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-43517 What requirements apply to piping, tubing, and fittings? (1) Regulators must be connected directly to the container valve outlet or mounted securely by means of support bracket and connected to the container valve or valves with a listed high pressure flexible connector.

(2) Provision must be made between the regulator outlet and the gas service lines by either a flexible connector or a tubing loop to provide for expansion, contraction, jarring, and vibration.

(3) Aluminum alloy piping is prohibited. Steel tubing must have a minimum wall thickness of 0.049 inch. Steel piping or tubing must be adequately protected against exterior corrosion.

(4) Approved gas tubing fittings must be used for tubing connections.

(5) The fuel line must be firmly fastened in a protected location and where under the vehicle and outside and below any insulation or false bottom, fastenings must prevent abrasion or damage to the gas line due to vibration. Where the fuel line passes through structural members or floors, a rubber grommet or equivalent must be installed to prevent chafing.

(6) The fuel line must be installed to enter the vehicle through the floor directly beneath or adjacent to the appliance that it serves. When a branch line is required, the tee

connection must be in the main fuel line and located under the floor and outside the vehicle.

(7) All parts of the system assembly must be designed and secured to preclude such parts working loose during transit.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-43517, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-43519 What requirements apply to appliances? (1) LP-gas appliances must be approved for use on commercial vehicles.

(2) In vehicles not intended for human occupancy, where the gas-fired heating appliance is used to protect the cargo, such heater may be unvented, but provision must be made to dispose of the products of combustion to the outside.

(3) In vehicles intended for human occupancy, all gas-fired heating appliances, including water heaters, must be designed or installed to provide for complete separation of the combustion system from the atmosphere of the living space. Such appliances must be installed with the combustion air inlet assembly furnished as a component of the appliance, and with either:

(a) The flue gas outlet assembly furnished as a component of the appliance; or

(b) A listed roof jack if the appliance is listed for such use.

The combustion air inlet assembly, flue gas outlet assembly, and roof jack must extend to the outside atmosphere.

(4) Provision must be made to ensure an adequate supply of outside air for combustion.

(5) All gas-fired heating appliances and water heaters must have an approved automatic device designed to shut off the flow of gas to the main burner and to the pilot in the event the pilot flame is extinguished.

(6) Gas-fired appliances installed in the cargo space must be readily accessible.

(7) Appliances must be constructed or protected to minimize the possible damage or impaired operation resulting from cargo shifting or handling.

(8) Appliances inside the vehicle must be located so that a fire at an appliance will not block the exit route.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-43519, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-43521 What general precautions must be followed for LP-gas system installations on commercial vehicles? (1) DOT containers must be marked, maintained, and requalified for use according to DOT regulations.

(2) Containers that have not been requalified according to DOT regulations must be removed from service. Requalified containers must be stamped with the date of requalification. When DOT cylinders are requalified by retesting, the retest must be made according to DOT regulations.

(3) Containers must not be charged with fuel unless they bear the proper markings of the code under which they were constructed, and with their water capacity. In the case of

cylinders or portable containers filled by weight, the container must be marked with its tareweight.

(4) DOT containers that have been involved in a fire must not be recharged until they have been requalified for service according to DOT regulations.

(5) API-ASME containers or ASME containers that have been involved in a fire must not be recharged until they have been retested according to the requirements for their original hydrostatic test and found to be suitable for continued service.

"API-ASME (ASME) container" means a container constructed according to the Rules for Construction of Unfired Pressure Vessels, section VIII, Division 1, American Society of Mechanical Engineers (ASME) Boiler and Pressure Vessel Code, 1968 edition.

(6) Containers must not be charged without the consent of the owner.

(7) A permanent caution plate must be provided on the appliance or adjacent to the container outside of any enclosure. It must include the word "caution" and the following or similar instructions.

(a) Be sure all appliance valves are closed before opening container valve.

(b) Connections at appliances, regulators, and containers must be checked periodically for leaks with soapy water or its equivalent.

(c) A match or flame must not be used to check for leaks.

(d) Container valves must be closed except when the equipment is in use.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-43521, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-43523 How must containers be charged? Containers must be charged according to DOT specifications.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-43523, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-43525 What fire protection must be provided for mobile cook units? Mobile cook units must have at least one approved portable fire extinguisher having a minimum rating of 8-B, C.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-43525, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-440 LP-gas service stations.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-440, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-44001 What does this section cover? WAC 296-306A-440 applies to storage containers, dispensing devices, and pertinent equipment in service stations where LP-gas is stored and dispensed into fuel tanks of motor vehicles. LP-gas service stations must meet all requirements of WAC 296-306A-410 and the requirements of this section.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-44001, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-44003 How must storage containers be designed and classified? Storage containers must be designed and classified according to the following table:

Container type	For gases with vapor press. Not to exceed lb. per sp. in. gauge 100°F (37.8°C.)	Minimum design pressure of container lb. per sp. in. gauge	
		1949 and earlier editions of ASME Code (Par. U-68, U-69)	1949 edition of ASME Code (Par. U-200, U-201); 1950, 1952, 1956, 1959, 1962, 1965, and 1968 (Division I) editions of ASME Code; All editions of API-ASME Code ²
200 ¹	215	200	250

¹Container type may be increased by increments of 25. The minimum design pressure of containers shall be 100% of the container type designation when constructed under 1949 or earlier editions of ASME Code (Par. U-68 and U-69). The minimum design pressure of containers shall be 125% of the container type designation when constructed under: 1. The 1949 ASME Code (Par. U-200 and U-201), 2. 1950, 1952, 1956, 1959, 1962, 1965, and 1968 (Division I) editions of the ASME Code, and 3. All editions of the API-ASME Code.

²Construction of containers under the API-ASME Code is not authorized after July 1, 1961.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-44003, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-44005 What requirements apply to valves and accessories? (1) A filling connection on the container must be fitted with one of the following:

(a) A combination back-pressure check and excess flow valve.

(b) One double or two single back-pressure valves.

(c) A positive shut-off valve, in conjunction with either:

(i) An internal back-pressure valve; or

(ii) An internal excess flow valve.

Instead of an excess flow valve, filling connections may be fitted with a quick-closing internal valve that only opens during operating periods. The mechanism for such valves may have a secondary control that will close automatically in case of fire. The melting point for a fusible plug must be a maximum of 220°F.

(2) A filling pipe inlet terminal off the container must have a positive shut-off valve and either:

(a) A back pressure check valve; or

(b) An excess flow check valve.

(3) All openings in the container must have approved excess flow check valves.

Exceptions:

(a) Filling connections;

(b) Safety-relief connections;

(c) Liquid-level gauging devices; and

(d) Pressure gauge connections.

(4) All container inlets and outlets must be labeled to designate whether they connect with vapor or liquid (labels may be on valves).

Exceptions:

(a) Safety-relief valves;

(b) Liquid-level gauging devices; and

(c) Pressure gauges.

(5) Each storage container must have a suitable pressure gauge.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-44005, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-44007 What requirements apply to safety devices? (1) All safety-relief devices must be installed as follows:

(a) On the container and directly connected with the vapor space.

(b) Safety-relief valves and discharge piping shall be protected against physical damage. The outlet must have loose-fitting rain caps. There shall be no return bends or restrictions in the discharge piping.

(c) The discharge from two or more safety-relief valves with the same pressure settings may be run into a common discharge header. The cross-sectional area of such header must be at least equal to the sum of the individual discharges.

(d) Discharge from a safety-relief device that terminates in or beneath any building is prohibited.

(2) Aboveground containers must have safety-relief valves as follows:

(a) The rate of discharge, which may be provided by one or more valves, must be at least that specified in WAC 296-306A-41025(2).

(b) The discharge from safety-relief valves must be vented upward to the open air to prevent impingement of escaping gas upon the container. You must use loose-fitting rain caps. On a container having a water capacity greater than 2,000 gallons, the discharge from the safety-relief valves must be vented upward away from the container to a point at least 7 feet above the container. Provisions must be made so that any liquid or condensate accumulation inside the relief valve or its discharge pipe will not render the valve inoperative. If a drain is used, you must protect the container, adjacent containers, piping, or equipment against impingement of flame resulting from ignition of the product escaping from the drain.

(3) Underground containers must have safety-relief valves as follows:

(a) The discharge from safety-relief valves must be piped upward to a point at least 10 feet above the ground. The discharge lines or pipes must be adequately supported and protected against physical damage.

(b) In areas where the manhole or housing may flood, the discharge from regulator vent lines should be above the highest probable water level.

(c) If no liquid is put into a container until after it is buried and covered, the rate of discharge of the relief valves may be reduced to at least 30 percent of the rate shown in WAC 296-306A-41025(2). If liquid fuel is present during installation of containers, the rate of discharge must be the same as for aboveground containers. Only empty containers may be uncovered.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-44007, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-44009 What is the maximum capacity allowed for containers? Individual storage containers must be a maximum of 30,000 gallons water capacity.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-44009, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-44011 How must storage containers be installed? (1) Each storage container used exclusively in service station operation must comply with the following table. This table outlines the minimum distances from a container to a building, group of buildings, or adjoining property lines that may be built on.

Minimum distances

Water capacity per container (gallons)	Aboveground and underground (feet)	Between aboveground containers (feet)
Up to 2,000	25	3
Over 2,000	50	5

Note: The above distances may be reduced to at least 10 feet for service station buildings of other than wood frame construction.

(a) Readily ignitable material including weeds and long dry grass, must be removed within 10 feet of containers.

(b) The minimum separation between LP-gas containers and flammable liquid tanks must be 20 feet and the minimum separation between a container and the centerline of the dike must be 10 feet.

(c) LP-gas containers located near flammable liquid containers must be protected against the flow or accumulation of flammable liquids by diking, diversion curbs, or grading.

(d) LP-gas containers located within diked areas for flammable liquid containers are prohibited.

(e) Field welding is permitted only on saddle plates or brackets that were applied by the container manufacturer.

(f) When permanently installed containers are interconnected, you must allow for expansion, contraction, vibration, and settling of containers and interconnecting piping. Where flexible connections are used, they must be approved and designed for a bursting pressure of at least five times the vapor pressure of the product at 100°F. Using nonmetallic hose is prohibited for interconnecting containers.

(g) Where high water table or flood conditions may be encountered, you must protect against container flotation.

(2) Aboveground containers must be installed according to this section.

(a) Containers may be installed horizontally or vertically.

(b) Containers must be protected by crash rails or guards to prevent physical damage unless they are protected by location. Servicing vehicles within 10 feet of containers is prohibited.

(c) Container foundations must be of substantial masonry or other noncombustible material. Containers must be mounted on saddles that permit expansion and contraction, and must provide against excess stresses. Corrosion protection must be provided for tank-mounting areas. Structural metal container supports must be protected against fire.

Exception: This protection is not required on prefabricated storage and pump assemblies, mounted on a common base, with container bottom a maximum of 24 inches above ground with water capacity of 2,000 gallons or less, if the piping connected to the storage and pump assembly is flexible enough to minimize breakage or leakage in case container supports fail.

(3) Underground containers must be installed according to this section.

(a) Containers must be given a protective coating before being placed underground. This coating must be equivalent to hot-dip galvanizing or to two coatings of red lead followed by a heavy coating of coal tar or asphalt. During installation, take care to minimize abrasion or other damage to the coating. Repair coating damage before back-filling.

(b) Containers must be set on a firm foundation (firm earth may be used) and surrounded with earth or sand firmly tamped in place. Backfill should be free of rocks or other abrasive materials.

(c) A minimum of 2 feet of earth cover must be provided. Where ground conditions make impractical, equivalent protection against physical damage must be provided. The portion of the container to which manhole and other connections are attached may be left uncovered. If there is vehicle traffic at the site, containers must be protected by a concrete slab or other cover to prevent the weight of a loaded vehicle imposing a load on the container shell.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-44011, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-44013 What equipment must be protected against tampering? Valves, regulators, gauges, and other container fittings must be protected against tampering and physical damage.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-44013, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-44015 What requirements apply to the transport truck unloading point? (1) During unloading, the transport truck must not be parked on public thoroughfares and must be at least 5 feet from storage containers. The truck must be positioned so that shut-off valves are accessible.

(2) The filling pipe inlet terminal must not be located within a building nor within 10 feet of any building or driveway. It must be protected against physical damage.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-44015, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-44017 What requirements apply to piping, valves, and fittings? (1) Piping may be underground, aboveground, or a combination of both. It must be well supported and protected against physical damage and corrosion.

(2) Piping laid beneath driveways must be installed to prevent physical damage by vehicles.

(3) Piping must be wrought iron or steel (black or galvanized), brass or copper pipe; or seamless copper, brass, or steel tubing and must be suitable for a minimum pressure of 250 psig. Pipe joints may be screwed, flanged, brazed, or

welded. The use of aluminum alloy piping or tubing is prohibited.

(4) All shut-off valves (liquid or gas) must be suitable for LP-gas service and designed for at least the maximum pressure to which they may be subjected. Valves that may be subjected to container pressure must have a rated working pressure of at least 250 psig.

(5) All materials used for valve seats, packing, gaskets, diaphragms, etc., must be resistant to the action of LP-gas.

(6) Fittings must be steel, malleable iron, or brass having a minimum working pressure of 250 psig. Cast iron pipe fittings, such as ells, tees and unions must not be used.

(7) All piping must be tested after assembly and proved free from leaks at least at the normal operating pressures.

(8) You must allow for expansion, contraction, jarring, and vibration, and for settling. You may use flexible connections.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-44017, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-44019 What requirements apply to pumps and accessory equipment? All pumps and accessory equipment must be suitable for LP-gas service, and designed for at least the maximum pressure to which they may be subjected. Accessories must have a minimum rated working pressure of 250 psig. Positive displacement pumps must have suitable pressure actuated bypass valves permitting flow from pump discharge to storage container or pump suction.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-44019, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-44021 What requirements apply to LP-gas dispensing devices? (1) Meters, vapor separators, valves, and fittings in the dispenser must be suitable for LP-gas service and must be designed for a minimum working pressure of 250 psig.

(2) Provisions must be made for venting LP-gas from a dispensing device to a safe location.

(3) Pumps used to transfer LP-gas must allow control of the flow and to prevent leakage or accidental discharge. Means must be provided outside the dispensing device to readily shut off the power in the event of fire or accident.

(4) A manual shut-off valve and an excess flow check valve must be installed downstream of the pump and ahead of the dispenser inlet.

(a) Dispensing hose must be resistant to the action of LP-gas in the liquid phase and designed for a minimum bursting pressure of 1,250 psig.

(b) An excess flow check valve or automatic shut-off valve must be installed at the terminus of the liquid line at the point of attachment of the dispensing hose.

(5) LP-gas dispensing devices must be located at least 10 feet from aboveground storage containers greater than 2,000 gallons water capacity. The dispensing devices must be at least 20 feet from any building (not including canopies), basement, cellar, pit, or line of adjoining property that may be built on and at least 10 feet from sidewalks, streets, or thoroughfares. No drains or blowoff lines must be directed into or in proximity to the sewer systems used for other purposes.

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(a) LP-gas dispensing devices must be installed on a concrete foundation or as part of a complete storage and dispensing assembly mounted on a common base, and must be adequately protected from physical damage.

(b) LP-gas dispensing devices must not be installed within a building.

Exception: Dispensing devices may be located under a weather shelter or canopy if the area is not enclosed on more than two sides. If the enclosing sides are adjacent, the area shall be properly ventilated.

(6) Dispensing LP-gas into the fuel container of a vehicle shall be performed by a competent attendant who shall remain at the LP-gas dispenser during the entire transfer operation.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-44021, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-44023 Is smoking allowed at LP-gas service stations? Smoking is prohibited on the driveway of service stations in the dispensing areas or transport truck unloading areas. Conspicuous signs prohibiting smoking must be posted within sight of the customer being served. Letters on such signs must be at least 4 inches high. The motors of all vehicles being fueled must be shut off during the fueling operations.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-44023, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-44025 What fire protection must be provided at LP-gas service stations? Each service station must have at least one approved portable fire extinguisher with at least an 8-B, C, rating.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-44025, filed 10/31/96, effective 12/1/96.]

Part U3 Other Hazardous Materials

WAC 296-306A-450 Other hazardous materials.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-450, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-45001 What general requirements apply to hazardous materials and flammable and combustible liquids? (1) Fuel must be stored, handled and marked according to the recommendations of the National Fire Protection Association (NFPA) or other agencies with jurisdiction.

(2) You must ensure that compressed gas cylinders under your control are in a safe condition to the extent that you can determine by visual inspection. Inspections must be conducted according to the hazardous materials regulations of the Department of Transportation (49 CFR Parts 171-179 and 14 CFR Part 103).

Exception: Where those regulations are not applicable, inspections must be conducted according to the Compressed Gas Association Pamphlets C-6-1968 and C-8-1962.

(3) Compressed gas cylinders, portable tanks, and cargo tanks must have pressure relief devices installed and main-

tained according to Compressed Gas Association Pamphlets S-1.1-1963 and 1965 addenda and S-1.2-1963.

(4) The following equipment must be shut down during refueling:

- Tractors;
- Agricultural equipment employing open flames; and
- Equipment with integral containers, such as flame cultivators, weed burners.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-45001, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-45003 What requirements apply to dip tanks containing flammable or combustible liquids? Dip tanks containing flammable or combustible liquids must meet the requirements of WAC 296-306A-450.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-45003, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-45005 What definitions apply to this section? "Dip tank" means a tank, vat, or container of flammable or combustible liquid in which articles or materials are immersed for coating, finishing, treating, or similar processes.

"Vapor area" means any area containing dangerous quantities of flammable vapors in the vicinity of dip tanks, drainboards or other drying, conveying, or other equipment during operation or shutdown.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-45005, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-45007 What requirements must ventilation systems meet? (1) Vapor areas must be limited to the smallest practical space by maintaining a properly designed ventilation system arranged to move air from all directions towards the vapor area and to a safe outside location. Ventilating systems must meet the requirements of the Standards for Blower and Exhaust Systems (NFPA Pamphlet No. 91-1969).

(2) For drying operations that use a heating system that is a potential source of ignition, the ventilation system must have a prevention process that must operate before the heating system can be started. The failure of any ventilating fan must automatically shut down the heating system. The installation must meet the requirements of the Standard for Ovens and Furnaces (NFPA No. 86A-1969).

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-45007, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-45009 What general requirements apply to the construction of dip tanks? (1) Dip tanks and drainboards must be constructed of substantial noncombustible material, and their supports must be of heavy metal, reinforced concrete, or masonry. Where dip tanks extend through a floor to the story below or where the weakening of the tank supports by fire may result in the tank collapse, supports should be of material with at least 1-hour fire resistance.

(2) The capacity of the salvage tank must be greater than the capacity of the dip tanks to which they are connected.

(3) All dip tanks exceeding 150 gallons liquid capacity or having a liquid surface area exceeding 4 square feet must be protected by at least one of the automatic extinguishing facilities in WAC 296-306A-45021 (2), (3), (4), (5) or (6).

Exception: Hardening and tempering tanks must meet the requirements of WAC 296-306A-45023.

(4) Dip tanks that use a conveyor system must be arranged so that, in the event of fire, the conveyor system must automatically stop and the bottom drains shall open. Conveyor systems must automatically stop unless required ventilation is in full operation.

(5) When dip tank liquids are heated by dipping heated articles or by other application of heat to the liquid, you must prevent a temperature rise greater than 50°F below the flashpoint of the liquid.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-45009, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-45011 How must overflow pipes for dip tanks be constructed? (1) Dip tanks of over 150 gallons in capacity or 10 square feet in liquid surface area must have a properly trapped overflow pipe leading to a safe location outside buildings. When practical, smaller dip tanks should be equipped the same way.

(2) The location and arrangement of the discharge of the overflow pipe must prevent hazards if the combustible contents of the dip tank overflows through the overflow pipe from fire fighting water. The overflow pipe should be large enough to conduct the maximum amount of water expected to be applied from automatic sprinklers or other sources in a fire.

(3) Overflow pipes must be large enough to overflow the maximum delivery of dip tank liquid fill pipes. They must be at least 3 inches in diameter or larger depending on the area of the liquid surface and the length and pitch of pipe.

(4) Piping connections on drains and overflow lines must be designed to allow access for inspection and cleaning of the interior.

(5) The bottom of the overflow connection must be at least 6 inches below the top of the tank.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-45011, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-45013 How must the bottom drains of dip tanks be constructed? (1) Dip tanks over 500 gallons in liquid capacity must have bottom drains that are automatically and manually arranged to quickly drain the tank in the event of fire. Manual operation must be from a safely accessible location. Where gravity flow is not practical, automatic pumps are required.

Exception: This requirement does not apply if the viscosity of the liquid at normal atmospheric temperature makes this impractical.

(2) Bottom drains must be trapped and discharged to a closed properly vented salvage tank or to a safe location outside.

(3) According to tank capacity, the diameter of the bottom drainpipe must be at least the following:

Gallons	Inches
500 to 750	3
750 to 1,000	4
1,000 to 2,500	5
2,500 to 4,000	6
Over 4,000	8

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-45013, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-45015 How must liquids used in dip tanks be stored and handled? The storage of flammable and combustible liquids in connection with dipping operations must meet the requirements of the National Fire Protection Association Standard for Drycleaning Plants, NFPA No. 32-1970; the National Fire Protection Association Standard for the Manufacture of Organic Coatings, NFPA No. 35-1970; the National Fire Protection Association Standard for Solvent Extraction Plants, NFPA No. 36-1967; and the National Fire Protection Association Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines, NFPA No. 37-1970.

Where portable containers are used to replenish flammable and combustible liquids, you must ensure that both the container and tank are positively grounded and electrically bonded to prevent static electric sparks.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-45015, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-45017 What measures must an employer take to prevent hazards from electrical and other ignition sources? (1) In vapor areas, there must be no open flames, spark producing devices, or heated surfaces hot enough to ignite vapors. Electrical wiring and equipment in any vapor area must be explosion proof as required in chapter 296-306A WAC Part T for Class I locations and must meet the requirements of chapter 296-306A WAC Part T.

Exception: The requirements for electrostatic apparatus are in WAC 296-306A-45027.

(2) Electrical equipment is prohibited in the vicinity of dip tanks, drainboards, or drying operations that are subject to splashing or dripping of dip tank liquids, unless the equipment is approved for locations containing deposits of readily ignitable residues and explosive vapors.

Exception: Wiring in rigid conduit or in threaded boxes or fittings containing no taps, splices, or terminal connections are permitted. Other exceptions are in WAC 296-306A-45027.

(3) In any floor space outside a vapor area but within 20 feet and not separated by tight partitions, open flames or spark producing devices are prohibited. Electrical wiring and equipment must meet the requirements of chapter 296-306A WAC Part T.

Exception: Open flames are only allowed as specifically permitted in NFPA Standard No. 86A-1969, Ovens and Furnaces, paragraph 200-7.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-45017, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-45019 How must dip tanks be operated and maintained? (1) The area around dip tanks must be kept as clear of combustible stock as practical and must be kept entirely free of combustible debris.

(2) When waste or rags are used in connection with dipping operations, approved metal waste cans must be provided. All impregnated rags or waste must be deposited in the cans immediately after use. The contents of waste cans must be properly disposed of at least once daily at the end of each shift.

(3) You must periodically inspect or test all dip tank facilities, including covers, overflow pipe inlets and discharge, bottom drains and valves, electrical wiring and equipment and grounding connections, ventilating facilities, and all extinguishing equipment. Any defects found must be promptly corrected.

(4) "No smoking" signs in large letters on contrasting color background must be conspicuously posted in the vicinity of dip tanks.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-45019, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-45021 What requirements must fire extinguishing systems meet? (1) Dip tank areas must have portable fire extinguishers suitable for flammable and combustible liquid fires, and that meet the requirements of WAC 296-306A-085.

(2) Automatic water spray extinguishing systems must meet the requirements of ANSI/NFPA No. 13, Sprinkler Systems, and NFPA No. 13, Sprinkler Systems Maintenance, and shall be arranged to protect tanks, drainboards, and stock over drainboards.

(3) Automatic foam extinguishing systems must meet the requirements of ANSI/NFPA No. 11, Foam Extinguishing Systems.

(a) The foam-producing material must be suitable for intended use, taking into account the characteristics of the dip tank liquid.

(b) The overflow pipe must be arranged to prevent foam from floating away and clogging the overflow pipe. You must use one of the following methods:

(i) The overflow pipe may be extended through tank wall and terminated in an ell pointing downward. The bottom of the overflow pipe at the point it enters the tank wall should be a maximum of 2 inches above the opening or the face of the ell.

(ii) The overflow pipe inlet may have a removable screen of 1/4-inch mesh with an area at least twice the cross-sectional area of overflow pipe. Screens that may be clogged by dip tank ingredients must be inspected and cleaned periodically.

(4) Automatic carbon dioxide systems must meet the requirements of ANSI/NFPA No. 12, Carbon Dioxide, and must be arranged to protect dip tanks and drainboards. The system must be arranged to protect stock over drainboards unless the stock is otherwise protected with automatic extinguishing facilities.

(5) Dry chemical extinguishing systems must meet the requirements of ANSI/NFPA No. 17, Dry Chemical Systems, and must be arranged to protect dip tanks and drainboards. The system must be arranged to protect stock over drain-

boards unless the stock is otherwise protected with automatic extinguishing facilities.

(6) Dip tank covers must meet the following requirements:

(a) Covers arranged to close automatically in the event of fire must be actuated by approved automatic devices and shall also be designed for manual operation.

(b) Covers must be of substantial noncombustible material or tin-clad with enclosing metal applied with locked joints.

(c) Chains or wire rope must be used for the cover support or operating mechanism where a burnt cord would interfere with the device action.

(d) Covers must be kept closed when tanks are not in use.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-45021, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-45023 What requirements apply to hardening and tempering tanks? (1) Tanks must be located as far as practical from furnaces and away from combustible floors.

(2) Tanks must have a noncombustible hood and vent or other equivalent means of venting to the outside of the building that will serve as a vent in case of fire. All vent ducts must be treated as flues and be kept away from combustible roofs or materials.

(3) Tanks must be designed so that the maximum workload is incapable of raising the temperature of the cooling medium to within 50°F below its flashpoint, or tanks must have circulating cooling systems that will provide equal protection.

(4) Tanks must have a high temperature limit switch arranged to sound an alarm when the temperature of the quenching medium reaches within 50°F below the flashpoint. If practical from an operating standpoint, such limit switches must also shut down conveying equipment supplying work to the tank.

(5) All hardening and tempering tanks exceeding 500 gallons liquid capacity or having a liquid surface area exceeding 25 square feet must be protected with at least one of the automatic extinguishing facilities conforming to WAC 296-306A-45021 (2), (3), (4), (5) or (6).

(6) Using air under pressure to fill or to agitate oil tanks is prohibited.

(7) Bottom drains may be combined with the oil circulating system or arranged independently to drain the oil to a safe location. The drain valve must be operated automatically with approved heat actuated devices or manually. The valve of a manual device must be operated from a safe distance.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-45023, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-45025 What requirements apply to flow coat applications? (1) All dip tank requirements must apply to flow coat operations.

(2) All piping must be strongly erected and rigidly supported.

(3) Paint must be supplied by direct low-pressure pumping arranged to automatically shut down by an ap-

proved heat actuated device in the case of fire, or paint may be supplied by a gravity tank with a maximum capacity of 10 gallons.

(4) The sump area and any areas on which paint flows should be considered the area of dip tank.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-45025, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-45027 What requirements apply to electrostatic apparatus? (1) All requirements of WAC 296-306A-450 apply to electrostatic detearing equipment unless otherwise specified.

(2) Electrostatic apparatus and devices used in connection with paint detearing operations must be approved.

(3) Transformers, powerpacks, control apparatus, and all other electrical portions of the equipment must be located outside the vapor area or must meet the requirements of WAC 296-306A-45017.

Exception: This requirement does not apply to high voltage grids and their connections.

(4) Electrodes must be substantially constructed, rigidly supported in permanent locations, and insulated from ground. Insulators must be nonporous and noncombustible.

(5) High voltage leads to electrodes must be permanently supported on suitable insulators, and guarded against accidental contact or grounding. An automatic means must be provided for grounding and discharging any accumulated residual charge on the electrode assembly or the secondary circuit of the high voltage transformer when the transformer primary is disconnected from the supply source.

(6) Maintain space between goods being deteared and electrodes or conductors of at least twice the sparking distance. A sign stating the sparking distance must be conspicuously posted near the assembly.

(7) Goods being deteared using the electrostatic process must be supported on conveyors. The conveyors must be arranged to maintain safe distances between the goods and the electrodes at all times. All goods must be supported to prevent any swinging or movement that would reduce the clearance to less than twice the sparking distance.

Exception: The electrostatic process is prohibited where goods being deteared are manipulated by hand.

(8) Electrostatic apparatus must have automatic controls that will operate immediately to disconnect the power supply to the high voltage transformer and to signal the operator under any of the following conditions:

(a) The ventilating fans stop or the ventilating equipment fails for any cause;

(b) The conveyor carrying goods past the high voltage grid stops;

(c) A ground or imminent ground at any point on the high voltage system occurs; or

(d) Clearance is reduced below twice the sparking distance.

(9) Adequate fencing, railings, or guards must be placed so that they ensure that the process is safely isolated from plant storage or employees. Such railings, fencing and guards must be of conducting material, adequately grounded, and should be at least 5 feet from processing equipment.

(10) Electrode insulators must be kept clean and dry.

(11) The detearing area must be ventilated according to WAC 296-306A-45007.

(12) All areas for detearing must be protected by automatic sprinklers where this protection is available. Where this protection is not available, other approved automatic extinguishing equipment must be provided.

(13) Drip plates and screens subject to paint deposits must be removable and shall be taken to a safe place for cleaning.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-45027, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-45029 What requirements apply to roll coating applications? Sparks from static electricity must be prevented by electrically bonding and grounding all rotating metal and other machinery, and by the installation of static collectors or maintaining a conductive atmosphere such as a high relative humidity.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-45029, filed 10/31/96, effective 12/1/96.]

Part V Welding

WAC 296-306A-475 Welding, cutting, and brazing.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-475, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-47501 What definitions apply to this part? "Welder" and "welding operator" mean any operator of electric or gas welding and cutting equipment.

All other welding terms are defined according to American Welding Society, Terms and Definitions, A3.0-1969.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-47501, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-480 Installation and operation of oxygen fuel gas systems for welding and cutting.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-480, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-48001 What general requirements apply to oxygen fuel gas systems? (1) Explosive mixtures of fuel gases and air or oxygen must be guarded against. No accessory that allows air or oxygen to mix with flammable gases prior to use must be allowed unless approved for that purpose.

Exception: Air or oxygen may mix with flammable gases at the burner or in a standard torch.

(2) Acetylene must never be generated, piped (except in approved cylinder manifolds) or used at a pressure in excess of 15 psi gauge pressure or 30 psi absolute pressure. (The 30 psi absolute pressure limit is intended to prevent unsafe use of acetylene in pressurized chambers such as caissons,

underground excavations or tunnel construction.) Using liquid acetylene is prohibited.

Exception: This requirement does not apply to storage of acetylene dissolved in a suitable solvent in cylinders manufactured and maintained according to DOT requirements, or to acetylene for chemical use.

(3) Only approved apparatus such as torches, regulators or pressure-reducing valves, acetylene generators, and manifolds must be used. Replacement tips may be used on approved torches, if the replacement tips are made to the same specifications as the original, or when replacements are used with convertor/adaptors that meet the same specifications.

(4) Before leaving any employee in charge of the oxygen or fuel-gas supply equipment, including generators, and oxygen or fuel-gas distribution piping systems, you must ensure that the employee has received proper instruction and is competent to do the work. Rules and instructions covering the operation and maintenance of oxygen or fuel-gas supply equipment including generators, and oxygen or fuel-gas distribution piping systems must be readily available.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-48001, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-48003 What requirements apply to portable cylinders? All portable cylinders used for storing and shipping compressed gases must be constructed and maintained according to DOT regulations.

(1) Compressed gas cylinders must be legibly marked with either the chemical or the trade name of the gas. The marking must be a permanent stencil, stamp, or label. Whenever practical, the marking must be located on the shoulder of the cylinder.

(2) Compressed gas cylinders must have connections that meet the requirements of the American National Standard Compressed Gas Cylinder Valve Outlet and Inlet Connections, ANSI B 57.1-1965.

(3) All cylinders with a water weight capacity greater than thirty pounds must have means of connecting a valve protection cap or with a collar or recess to protect the valve.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-48003, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-48005 What general requirements apply to storing compressed gas cylinders? (1) Cylinders must be kept away from radiators and other sources of heat.

(2) Indoors, cylinders must be stored in a well-protected, well-ventilated, dry area, at least twenty feet from highly combustible materials such as oil or excelsior. Cylinders should be stored in assigned places away from elevators, stairs, or gangways. Assigned storage spaces must be located where cylinders will not be knocked over or damaged by passing or falling objects, or subject to tampering. All cylinder enclosures must be ventilated.

(3) Empty cylinders must have their valves closed.

(4) Valve protection caps on cylinders designed to accept a cap, must always be in place and hand-tight, except when cylinders are in use or connected for use.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-48005, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-48007 How must fuel-gas cylinders be stored? Cylinders stored indoors, except those in use or attached ready for use, must be limited to a total gas capacity of 2,000 cubic feet or 300 pounds of LP-gas.

(1) Cylinders in excess of 2,000 cubic feet total gas capacity or 300 pounds of LP-gas, must be stored in a separate room or compartment that meets the requirements of 252 (a)(8) and (9) CFR, or cylinders must be kept outside or in a special building. Special buildings, rooms or compartments must be free from open flame for heating or lighting and must be well ventilated. They may also be used for storage of a maximum of 600 pounds of calcium carbide, when contained in metal containers complying with 252 (a)(7)(a) and (b) CFR. Signs should be conspicuously posted in such rooms reading, "Danger—No smoking, matches or open lights," or other equivalent wording.

(2) Acetylene cylinders must be stored valve end up.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-48007, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-48009 How must oxygen cylinders be stored? (1) Oxygen cylinders must not be stored near highly combustible material, especially oil and grease; or near reserve stocks of carbide and acetylene or other fuel-gas cylinders, or near any other substance likely to cause or accelerate fire; or in an acetylene generator compartment.

(2) Oxygen cylinders stored in outside generator houses must be separated from the generator or carbide storage rooms by a noncombustible partition having a fire-resistance rating of at least one hour. This partition must be without openings and must be gastight.

(3) Oxygen cylinders in storage must be separated from fuel-gas cylinders or combustible materials (especially oil or grease), a minimum of 20 feet or by a noncombustible barrier at least five feet high having a fire-resistance rating of at least one-half hour. (Cylinders "in-use," secured to a hand truck or structural member, with regulators, hoses, and torch temporarily removed for security purposes overnight or weekends, are not considered "in-storage.")

(4) Where a liquid oxygen system is to be used to supply gaseous oxygen for welding or cutting and the system has a storage capacity of more than 13,000 cubic feet of oxygen (measured at 14.7 psi(a) and 70°F), connected in service or ready for service, or more than 25,000 cubic feet of oxygen (measured at 14.7 psi(a) and 70°F), including unconnected reserves on hand at the site, it must meet the requirements of the Standard for Bulk Oxygen Systems at Consumer Sites, NFPA No. 566-1965.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-48009, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-48011 What general operating procedures apply to working with cylinders and containers? (1) The numbers and markings stamped into cylinders must not be tampered with.

(2) Cylinders, cylinder valves, couplings, regulators, hose, and apparatus must be kept free from oily or greasy substances. Oxygen cylinders or apparatus must not be handled with oily hands or gloves. A jet of oxygen must never be permitted to strike an oily surface, greasy clothes, or enter a fuel oil or other storage tank.

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(3) Cylinders must be kept far enough away from the actual welding or cutting operation so that sparks, hot slag, or flame will not reach them, or fire-resistant shields must be provided.

(4) No person, other than the gas supplier, may attempt to mix gases in a cylinder. No one, except the owner of the cylinder or person authorized by the owner, may refill a cylinder.

(5) Cylinders must not be placed where they might become part of an electric circuit. Contacts with third rails, trolley wires, etc., must be avoided.

(6) Fuel-gas cylinders must be placed with valve end up whenever they are in use. Liquefied gases must be stored and shipped with the valve end up.

(7) A suitable cylinder truck, chain, or other steadying device must be used to prevent cylinders from being knocked over while in use.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-48011, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-48013 What requirements apply to safety devices on cylinders? (1) Valve-protection caps must not be used for lifting cylinders from one vertical position to another. Bars must not be used under valves or valve-protection caps to pry cylinders loose when frozen to the ground or otherwise fixed; we recommend using warm (not boiling) water. Valve-protection caps are designed to protect cylinder valves from damage.

(2) Cylinders without fixed hand wheels must have keys, handles, or nonadjustable wrenches on valve stems while these cylinders are in service. In multiple cylinder installations only one key or handle is required for each manifold.

(3) No one may tamper with safety devices in cylinders or valves.

(4) Nothing may be placed on top of an acetylene cylinder when in use that may damage the safety device or interfere with the quick closing of the valve.

(5) Where a special wrench is required it must be left in position on the stem of the valve while the cylinder is in use so that the fuel-gas flow can be quickly turned off in case of emergency. In the case of manifolded or coupled cylinders at least one such wrench must always be available for immediate use.

(6) Cylinders with leaking fuse plugs or other leaking safety devices should be plainly marked with a warning not to approach them with a lighted cigarette or other source of ignition. You should notify the supplier promptly and follow the supplier's instructions as to their return.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-48013, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-48015 How must cylinders be transported? (1) When transporting cylinders by a crane or derrick, a cradle, boat, or suitable platform must be used. Slings or electric magnets are prohibited for this purpose. Valve-protection caps, where cylinder is designed to accept a cap, must always be in place.

(2) Unless cylinders are secured on a special truck, regulators must be removed and valve-protection caps, when

provided for, must be put in place before cylinders are moved.

(3) When cylinders are transported by powered vehicle they must be secured in a vertical position.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-48015, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-48017 How must cylinders be handled? (1) Cylinders must not be dropped or struck or permitted to strike each other violently.

(2) Cylinders must be handled carefully. Cylinders must not be subjected to rough handling, knocks, or falls that are liable to damage the cylinder, valve or safety devices and cause leakage.

(3) Cylinders must never be used as rollers or supports, whether full or empty.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-48017, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-48019 What requirements apply to cylinder valves? (1) Cylinder valves must be closed before moving cylinders.

(2) Cylinder valves must be closed when work is finished.

(3) Valves of empty cylinders must be closed.

(4) A hammer or wrench must not be used to open cylinder valves. If valves cannot be opened by hand, the supplier must be notified.

(5) Cylinder valves must not be tampered with nor should any attempt be made to repair them. If you have trouble with a cylinder, you should send a report to the supplier indicating the character of the trouble and the cylinder's serial number. You must follow the supplier's instructions on what to do with the cylinder.

(6) Complete removal of the stem from a diaphragm-type cylinder valve must be avoided.

(7) If cylinders are found to have leaky valves or fittings that cannot be stopped by closing of the valve, the cylinders must be taken outdoors away from sources of ignition and slowly emptied.

(8) The cylinder valve must always be opened slowly.

(9) An acetylene cylinder valve must not be opened more than one and one-half turns of the spindle, and preferably no more than three-fourths of a turn.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-48019, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-48021 What requirements apply to cylinder regulators? (1) Unless connected to a manifold, oxygen from a cylinder must first have an oxygen regulator attached to the cylinder valve.

(2) Before connecting a regulator to a cylinder valve, the valve must be opened slightly and closed immediately. The valve must be opened while standing to one side of the outlet; never in front of it. Fuel-gas cylinder valves must not be cracked near other welding work or near sparks, flame, or other possible sources of ignition.

(3) Before a regulator is removed from a cylinder valve, the cylinder valve must be closed and the gas released from the regulator.

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(4) Fuel-gas must not be used from cylinders through torches or other devices equipped with shut-off valves without reducing the pressure through a suitable regulator attached to the cylinder valve or manifold.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-48021, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-48023 What requirements apply to fuel-gas manifolds? (1) Manifolds must be approved either separately for each component part or as an assembled unit.

(2) Fuel-gas cylinders connected to one manifold inside a building must be limited to a maximum total capacity of 300 pounds of LP-gas or 3,000 cubic feet of other fuel-gas. More than one such manifold with connected cylinders may be located in the same room if the manifolds are at least 50 feet apart or separated by a noncombustible barrier at least 5 feet high having a fire-resistance rating of at least one-half hour.

(3) Exception: Fuel-gas cylinders connected to one manifold having an aggregate capacity exceeding 300 pounds of LP-gas or 3,000 cubic feet of other fuel-gas must be located outdoors, or in a separate building or room constructed according to 252 (a)(8) and (9) CFR.

(4) Separate manifold buildings or rooms may also be used for the storage of drums of calcium carbide and cylinders containing fuel gases as provided in WAC 296-306A-48007. Such buildings or rooms must have no open flames for heating or lighting and must be well ventilated.

(5) High-pressure fuel-gas manifolds must have approved pressure regulating devices.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-48023, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-48025 What requirements apply to high pressure oxygen manifolds? This section applies to cylinders with a DOT service pressure above 200 psig.

(1) Manifolds must be approved either separately for each component or as an assembled unit.

(2) Oxygen manifolds must not be located in an acetylene generator room. Oxygen manifolds must be separated from fuel-gas cylinders or combustible materials (especially oil or grease), a minimum distance of 20 feet or by a noncombustible barrier at least 5 feet high having a fire-resistance rating of at least one-half hour.

(3) Oxygen cylinders connected to one manifold must be limited to a total gas capacity of 6,000 cubic feet. More than one such manifold with connected cylinders may be located in the same room if the manifolds are at least 50 feet apart or separated by a noncombustible barrier at least 5 feet high having a fire-resistance rating of at least one-half hour.

(4) Exception: An oxygen manifold, to which cylinders having an aggregate capacity of more than 6,000 cubic feet of oxygen are connected, should be located outdoors or in a separate noncombustible building. Such a manifold, if located inside a building having other occupancy, must be located in a separate room of noncombustible construction having a fire-resistance rating of at least one-half hour or in an area with no combustible material within 20 feet of the manifold.

(5) An oxygen manifold or oxygen bulk supply system that has storage capacity of more than 13,000 cubic feet of

oxygen (measured at 14.7 psia and 70°F), connected in service or ready for service, or more than 25,000 cubic feet of oxygen (measured at 14.7 psia and 70°F), including unconnected reserves on hand at the site, must meet the requirements of the Standard for Bulk Oxygen Systems at Consumer Sites, NFPA No. 566-1965.

(6) High-pressure oxygen manifolds must have approved pressure-regulating devices.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-48025, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-48027 What requirements apply to low pressure oxygen manifolds? This section applies to cylinders with a maximum DOT service pressure of 200 psig.

(1) Manifolds must be of substantial construction suitable for use with oxygen at a pressure of 250 psig. They must have a minimum bursting pressure of 1,000 psig and must be protected by a safety-relief device that will relieve at a maximum pressure of 500 psig.

Note: DOT-4L200 cylinders have safety devices that relieve at a maximum pressure of 250 psig (or 235 psig if vacuum insulation is used).

(2) Hose and hose connections subject to cylinder pressure must meet the requirements of WAC 296-306A-48049. Hose must have a minimum bursting pressure of 1,000 psig.

(3) The assembled manifold including leads must be tested and proven gas-tight at a pressure of 300 psig. The fluid used for testing oxygen manifolds must be oil-free and not combustible.

(4) The location of manifolds must meet the requirements of WAC 296-306A-48025.

(5) The following sign must be conspicuously posted at each manifold:

Low-Pressure Manifold
Do Not Connect High-Pressure Cylinders
Maximum Pressure—250 PSIG

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-48027, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-48029 What requirements apply to manifolding portable outlet headers? (1) Portable outlet headers must not be used indoors except for temporary service where the conditions preclude a direct supply from outlets located on the service piping system.

(2) Each outlet on the service piping from which oxygen or fuel-gas is withdrawn to supply a portable outlet header must have a readily accessible shut-off valve.

(3) Hose and hose connections used for connecting the portable outlet header to the service piping must meet the requirements of WAC 296-306A-48051.

(4) Master shut-off valves for both oxygen and fuel-gas must be provided at the entry end of the portable outlet header.

(5) Portable outlet headers for fuel-gas service must have an approved hydraulic back-pressure valve installed at the inlet and preceding the service outlets, unless an approved pressure-reducing regulator, an approved backflow check valve, or an approved hydraulic back-pressure valve is installed at each outlet. Outlets provided on headers for

oxygen service may be fitted for use with pressure-reducing regulators or for direct hose connection.

(6) Each service outlet on portable outlet headers must have a valve assembly that includes a detachable outlet seal cap, chained or otherwise attached to the body of the valve.

(7) Materials and fabrication procedures for portable outlet headers must comply with WAC 296-306A-48033, 296-306A-48035, and 296-306A-48041.

(8) Portable outlet headers must have frames that will support the equipment securely in the correct operating position and protect them from damage during handling and operation.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-48029, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-48031 What operating procedures apply to cylinder manifolds? (1) Cylinder manifolds must be installed under the supervision of someone familiar with the proper practices of construction and use.

(2) All component parts used in the methods of manifolding described in WAC 296-306A-48023 must have the materials, design and construction approved either separately or as an assembled unit.

(3) All manifolds and parts used in methods of manifolding must be used only for the gas or gases for which they are approved.

(4) When acetylene cylinders are coupled, approved flash arresters must be installed between each cylinder and the coupler block. For outdoor use only, and when the number of cylinders coupled does not exceed three, one flash arrester installed between the coupler block and regulator is acceptable.

(5) Each fuel-gas cylinder lead should have a backflow check valve.

(6) The maximum aggregate capacity of fuel-gas cylinders connected to a portable manifold inside a building must be 3,000 cubic feet of gas.

(7) Acetylene and liquefied fuel-gas cylinders must be manifolded vertically.

(8) The pressure in the gas cylinders connected to and discharged simultaneously through a common manifold must be approximately equal.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-48031, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-48033 How must service piping systems be designed? (1) Piping and fittings must comply with Section 2, Industrial Gas and Air Piping Systems, of the American National Standard Code for Pressure Piping, ANSI B 31.1-1967, if they do not conflict with subsections (2) and (3) of this section.

(2) Pipe must be at least Schedule 40 and fittings must be at least standard weight in sizes up to and including 6-inch nominal.

(3) Copper tubing must be Types K or L according to the Standard Specification for Seamless Copper Water Tube, ASTM B88-66a.

(4) Piping must be steel, wrought iron, brass or copper pipe, or seamless copper, brass or stainless steel tubing, except as provided in subsections (5) through (9) of this section.

(5) Oxygen piping and fittings at pressures in excess of 700 psig, must be stainless steel or copper alloys.

(6) Hose connections and hose complying with WAC 296-306A-48051 may be used to connect the outlet of a manifold pressure regulator to piping if the working pressure of the piping is 250 psig or less and the length of the hose is a maximum of 5 feet. Hose must have a minimum bursting pressure of 1,000 psig.

(7) When oxygen is supplied to a service piping system from a low-pressure oxygen manifold without an intervening pressure regulating device, the piping system must have a minimum design pressure of 250 psig. A pressure regulating device must be used at each station outlet when the connected equipment is for use at pressures less than 250 psig.

(8) Piping for acetylene or acetylenic compounds must be steel or wrought iron.

(9) Unalloyed copper must only be used for acetylene or acetylenic compounds in listed equipment.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-48033, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-48035 What requirements apply to piping joints? (1) Joints in steel or wrought iron piping must be welded, threaded or flanged. Fittings, such as ells, tees, couplings, and unions, must be rolled, forged or cast steel, malleable iron or nodular iron. Gray or white cast iron fittings are prohibited.

(2) Joints in brass or copper pipe must be welded, brazed, threaded, or flanged. Socket type joints must be brazed with silver-brazing alloy or similar high melting point (not less than 800°F) filler metal.

(3) Joints in seamless copper, brass, or stainless steel tubing must be approved gas tubing fittings or the joints must be brazed. Socket type joints must be brazed with silver-brazing alloy or similar high melting point (not less than 800°F) filler metal.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-48035, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-48037 How must service piping systems be installed? (1) Distribution lines must be installed and maintained in a safe operating condition.

(2) Piping may be above or below ground. All piping must be run as directly as practical, protected against physical damage, with an allowance for expansion and contraction, jarring and vibration. Pipe laid underground in earth must be below the frost line and protected against corrosion. After assembly, piping must be thoroughly blown out with air or nitrogen to remove foreign materials. For oxygen piping, only oil-free air, oil-free nitrogen, or oil-free carbon dioxide must be used.

(3) Only piping that has been welded or brazed must be installed in tunnels, trenches or ducts. Shut-off valves must be located outside such conduits. Oxygen piping may be placed in the same tunnel, trench or duct with fuel-gas pipelines, if there is good natural or forced ventilation.

(4) Low points in piping carrying moist gas must be drained into drip pots constructed to permit pumping or draining out the condensate at necessary intervals. Drain valves must be installed for this purpose having outlets normally closed with screw caps or plugs. Open end valves

or petcocks are prohibited, except that in drips located outdoors, underground, and not readily accessible, valves may be used at such points if they have means to secure them in the closed position. Pipes leading to the surface of the ground must be cased or jacketed where necessary to prevent loosening or breaking.

(5) Gas cocks or valves must be provided for all buildings at points where they will be readily accessible for shutting off the gas supply to these buildings in any emergency. Underground valve boxes or manholes should be avoided wherever possible. There must be a shut-off valve in the discharge line from the generator, gas holder, manifold or other source of supply.

(6) Shut-off valves must not be installed in safety-relief lines in such a manner that the safety-relief device can be rendered ineffective.

(7) Fittings and lengths of pipe must be examined internally before assembly and, if necessary, freed from scale or dirt. Oxygen piping and fittings must be washed out with a suitable solution that will effectively remove grease and dirt but will not react with oxygen.

Note: Hot water solutions of caustic soda or trisodium phosphate are effective for this purpose.

(8) Piping must be thoroughly blown out after assembly to remove foreign materials. For oxygen piping, oil-free air, oil-free nitrogen, or oil-free carbon dioxide must be used. For other piping, air or inert gas may be used.

(9) When flammable gas lines or other parts of equipment are being purged of air or gas, open lights or other sources of ignition are prohibited near uncapped openings.

(10) No welding or cutting must be performed on an acetylene or oxygen pipeline, including the attachment of hangers or supports, until the line has been purged. Only oil-free air, oil-free nitrogen, or oil-free carbon dioxide must be used to purge oxygen lines.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-48037, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-48039 How must service piping systems be painted and marked? (1) Underground pipe and tubing and outdoor ferrous pipe and tubing must be covered or painted with a suitable material for protection against corrosion.

(2) Aboveground piping systems must be marked according to the American National Standard Scheme for the Identification of Piping Systems, ANSI A 13.1-1956.

(3) Station outlets must be marked to indicate the name of the gas.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-48039, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-48041 How must service piping systems be tested? (1) Piping systems must be tested and proved gastight at 1-1/2 times the maximum operating pressure, and must be thoroughly purged of air before being placed in service. The material used for testing oxygen lines must be oil free and noncombustible. Flames must not be used to detect leaks.

(2) When flammable gas lines or other parts of equipment are being purged of air or gas, sources of ignition are prohibited near uncapped openings.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-48041, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-48043 How must equipment be installed? Equipment shall be installed and used only in the service for which it is approved and as recommended by the manufacturer.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-48043, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-48045 How must service piping systems be protected? Service piping systems must be protected by pressure relief devices set to function at not more than the design pressure of the systems and discharging upwards to a safe location.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-48045, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-48047 What requirements apply to piping protective equipment? (1) The fuel-gas and oxygen piping systems, including portable outlet headers must incorporate the protective equipment shown in Figures V-1, V-2, and V-3.

When only a portion of a fuel-gas system is to be used with oxygen, only that portion must meet this requirement.

(2) Approved protective equipment (designated PF in Figs. V-1, V-2, and V-3) must be installed in fuel-gas piping to prevent:

- (a) Backflow of oxygen into the fuel-gas supply system;
- (b) Passage of a flash back into the fuel-gas supply system; and
- (c) Excessive back pressure of oxygen in the fuel-gas supply system. The three functions of the protective equipment may be combined in one device or may be provided by separate devices.

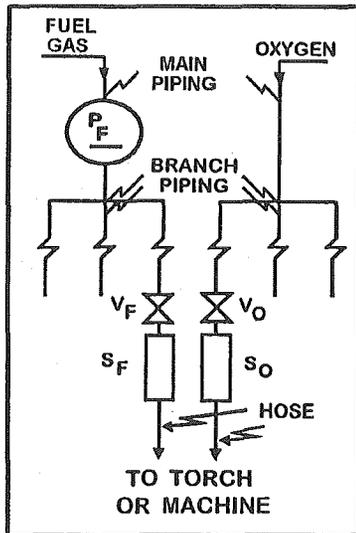


Fig. 1

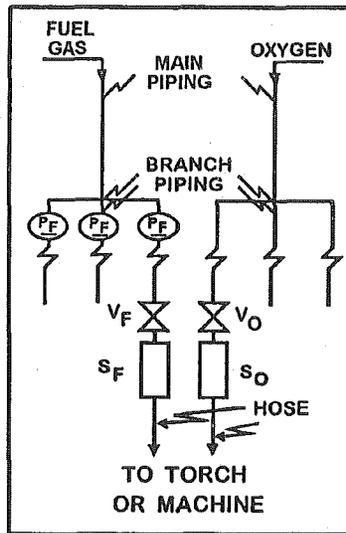


Fig. 2

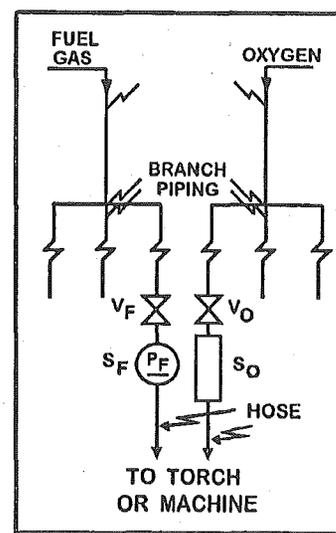


Fig. 3

- PF = Protective equipment in fuel-gas piping
- VF = Fuel-gas station outlet valve
- VO = Oxygen station outlet valve
- SF = Backflow prevention device(s) at fuel-gas station outlet
- SO = Backflow prevention device(s) at oxygen station outlet

(3) The protective equipment must be located in the main supply line, as in Figure 1 or at the head of each branch line, as in Figure 2 or at each location where fuel-gas is withdrawn, as in Figure 3. Where branch lines are of 2-inch pipe size or larger or of substantial length, protective equipment (designated as PF) shall be located as shown in either 2 or 3.

(4) Backflow protection must be provided by an approved device that will prevent oxygen from flowing into the fuel-gas system or fuel from flowing into the oxygen system (see SF, Figs. 1 and 2).

(5) Flash-back protection must be provided by an approved device that will prevent flame from passing into the fuel-gas system.

(6) Back-pressure protection must be provided by an approved pressure-relief device set at a pressure not greater than the pressure rating of the backflow or the flashback protection device, whichever is lower. The pressure-relief device must be located on the downstream side of the backflow and flashback protection devices. The vent from the pressure-relief device must be at least as large as the relief device inlet and must be installed without low points that may collect moisture. If low points are unavoidable, drip pots with drains closed with screw plugs or caps shall be installed at the low points. The vent terminus must not endanger personnel or property through gas discharge; must be located away from ignition sources; and must terminate in a hood or bend.

(7) If pipeline protective equipment incorporates a liquid, the liquid level must be maintained, and a suitable antifreeze may be used to prevent freezing.

(8) Fuel-gas for use with equipment not requiring oxygen must be withdrawn upstream of the piping protective devices.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-48047, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-48049 What requirements apply to station outlet protective equipment? (1) A check valve pressure regulator, hydraulic seal, or combination of these devices must be provided at each station outlet, including those on portable headers, to prevent backflow, as shown in Figures 1, 2, and 3 and designated as SF and SO.

(2) When approved pipeline protective equipment (designated PF) is located at the station outlet as in Figure 3, no additional check valve, pressure regulator, or hydraulic seal is required.

(3) Each station outlet must have a shut-off valve (designated VF and VO) installed on the upstream side of other station outlet equipment.

(4) If the station outlet is equipped with a detachable regulator, the outlet must terminate in a union connection that meets the requirements of the Regulator Connection Standards, 1958, Compressed Gas Association.

(5) If the station outlet is connected directly to a hose, the outlet must terminate in a union connection that meets the requirements of the Standard Hose Connection Specifications, 1957, Compressed Gas Association.

(6) Station outlets may terminate in pipe threads to which permanent connections are to be made, such as to a machine.

(7) Station outlets must have a detachable outlet seal cap secured in place. This cap must be used to seal the outlet except when a hose, a regulator, or piping is attached.

(8) Where station outlets are equipped with approved backflow and flashback protective devices, as many as four torches may be supplied from one station outlet through rigid piping, if each outlet from such piping, is equipped with a shut-off valve and if the fuel-gas capacity of any one torch does not exceed 15 cubic feet per hour. This rule does not apply to machines.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-48049, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-48051 What requirements apply to hose and hose connections? (1) Hose for oxy-fuel gas service must meet the requirements of the Specification for Rubber Welding Hose, 1958, Compressed Gas Association and Rubber Manufacturers Association.

(2) The generally recognized colors are red for acetylene and other fuel-gas hose, green for oxygen hose, and black for inert-gas and air hose.

(3) When parallel lengths of oxygen and acetylene hose are taped together for convenience and to prevent tangling, a maximum of 4 inches out of 12 inches must be covered by tape.

(4) Hose connections must meet the requirements of the Standard Hose Connection Specifications, 1957, Compressed Gas Association.

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(5) Hose connections must be clamped or otherwise securely fastened so they will withstand, without leakage, twice the pressure to which they are normally subjected in service, but never less than a pressure of 300 psi. Oil-free air or an oil-free inert gas must be used for the test.

(6) Hose showing leaks, burns, worn places, or other defects rendering it unfit for service must be repaired or replaced.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-48051, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-48053 What requirements apply to pressure-reducing regulators? (1) Pressure-reducing regulators must be used only for the gas and pressures for which they are intended. The regulator inlet connections must meet the requirements of the Regulator Connection Standards, 1958, Compressed Gas Association.

(2) When regulators or parts of regulators, including gauges, need repair, the work must be performed by skilled mechanics who have been properly instructed.

(3) Gauges on oxygen regulators must be marked "USE NO OIL."

(4) Union nuts and connections on regulators must be inspected before use to detect faulty seats that may cause leakage of gas when the regulators are attached to the cylinder valves. Damaged nuts or connections must be destroyed.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-48053, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-485 Installation and operation of resistance welding equipment.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-485, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-48501 What general requirements apply to resistance welding equipment? (1) All equipment must be installed by a qualified electrician according to the requirements of chapter 296-306A WAC Part T. There must be a safety-type disconnecting switch or a circuit breaker or circuit interrupter to open each power circuit to the machine, conveniently located at or near the machine, so that the power can be shut off when the machine or its controls are to be serviced.

(2) Ignitron tubes used in resistance welding equipment must have a thermal protection switch.

(3) Employees designated to operate resistance welding equipment must have been properly instructed and judged competent to operate such equipment.

(4) Controls of all automatic or air and hydraulic clamps must be arranged or guarded to prevent the operator from accidentally activating them.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-48501, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-48503 What requirements apply to portable welding machines? (1) All portable welding guns must have suitable counter-balanced devices for supporting

the guns, including cables, unless the design of the gun or fixture makes counterbalancing impractical or unnecessary.

(2) All portable welding guns, transformers, and related equipment that is suspended from overhead structures, eye beams, or trolleys must have safety chains or cables. Safety chains or cables shall be able to support the total shock load in the event of failure of any component of the supporting system.

(3) When trolleys are used to support portable welding equipment, they must have suitable forged steel clevis for the attachment of safety chains. Each clevis must be able to support the total shock load of the suspended equipment in the event of trolley failure.

(4) All initiating switches, including retraction and dual schedule switches, located on the portable welding gun must have suitable guards able to prevent accidental initiation through contact with fixturing, operator's clothing, etc. Initiating switch voltage must be a maximum of 24 volts.

(5) The movable holder, where it enters the gun frame, must have enough clearance to prevent the shearing an operator's fingers if placed on the operating movable holder.

(6) The secondary and case of all portable welding transformers must be grounded. Secondary grounding may be by center tapped secondary or by a center tapped grounding reactor connected across the secondary.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-48503, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-48505 What requirements apply to flash welding equipment? (1) Flash welding machines must have a hood to control flying flash. In cases of high production, where materials may contain a film of oil and where toxic elements and metal fumes are given off, ventilation must be provided according to WAC 296-306A-50009 through 296-306A-50029.

(2) For the protection of the operators of nearby equipment, fire-resistant curtains or suitable shields must be set up around the machine and in such a manner that the operator's movements are not hampered.

(3) If the welding process cannot be isolated, anyone who may be exposed to the hazard of arc flash must be properly protected.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-48505, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-48507 Who must perform a job hazard analysis? A qualified person must perform a job hazard analysis on the operations to be performed on each welding machine to determine the safeguards and personal protective equipment that shall be used for each job.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-48507, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-48509 What maintenance requirements apply to resistance welding equipment? Qualified maintenance personnel must periodically inspect the equipment and maintain records of the inspections. The operator must be instructed to report any equipment defects to the supervisor and the use of the equipment must be discontinued until safety repairs have been completed.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-48509, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-490 Application, installation, and operation of arc welding and cutting equipment.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-490, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-49001 What environmental conditions must be taken into account when selecting arc welding equipment?

Note: You may ensure that your equipment is designed for safety by choosing equipment that complies with the Requirements for Electric Arc-Welding Apparatus, NEMA EW-1-1962, National Electrical Manufacturers Association or the Safety Standard for Transformer-Type Arc-Welding Machines, ANSI C33.2-1956, Underwriters' Laboratories.

(1) Standard machines for arc welding service must be designed and constructed to carry their rated load with rated temperature rises where the temperature of the cooling air is a maximum of 40°C (104°F) and where the altitude is a maximum of 3,300 feet, and must be suitable for operation in atmospheres containing gases, dust, and light rays produced by the welding arc.

(2) When exposed to the following or other conditions, machines must be designed to safely meet the requirements of the service.

- Unusually corrosive fumes;
- Steam or excessive humidity;
- Excessive oil vapor;
- Flammable gases;
- Abnormal vibration or shock;
- Excessive dust;
- Weather;
- Unusual seacoast or shipboard conditions.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-49001, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-49003 What voltages must arc welding equipment use? Open circuit (no load) voltages of arc welding and cutting machines should be as low as possible consistent with satisfactory welding or cutting being done. Following are the maximum limits:

- (1) For alternating-current machines:
 - (a) Manual arc welding and cutting—80 volts.
 - (b) Automatic (machine or mechanized) arc welding and cutting—100 volts.
- (2) For direct-current machines:
 - (a) Manual arc welding and cutting—100 volts.
 - (b) Automatic (machine or mechanized) arc welding and cutting—100 volts.

(3) When special welding and cutting processes require values of open circuit voltages higher than the above, means must be provided to prevent the operator from making accidental contact with the high voltage by adequate insulation or other means.

Note: For a.c. welding under wet conditions or warm surroundings where perspiration is a factor, the use of reliable automatic controls for reducing no load voltage is recommended to reduce the shock hazard.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-49003, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-49005 How must arc welding equipment be designed? (1) A controller integrally mounted in an electric motor driven welder must be able to carry the rated motor current, must be able to make and interrupt stalled rotor current of the motor, and may serve as the running overcurrent device if provided with the number of over-current units as specified by chapter 296-306A WAC Part T. Starters with magnetic undervoltage release should be used with machines installed more than one to a circuit to prevent circuit overload caused by simultaneously starting several motors upon return of voltage.

(2) On all types of arc welding machines, control apparatus must be enclosed except for the operating wheels, levers, or handles.

Note: Control handles and wheels should be large enough to be easily grasped by a gloved hand.

(3) Input power terminals, tap change devices, and live metal parts connected to input circuits must be completely enclosed and accessible only by tools.

(4) Terminals for welding leads should be protected from accidental electrical contact by employees or by metal objects i.e., vehicles, crane hooks, etc. You may provide protection with:

- Dead-front receptacles for plug connections;
- Recessed openings with nonremovable hinged covers;
- Heavy insulating sleeving or taping; or
- Other equivalent electrical and mechanical protection.

If a welding lead terminal that is intended to be used exclusively for connection to the work is connected to the grounded enclosure, it must be done by a conductor at least two AWG sizes smaller than the grounding conductor and the terminal must be marked to indicate that it is grounded.

(5) No connections for portable control devices (such as push buttons to be carried by the operator) must be connected to an a.c. circuit of higher than 120 volts. Exposed metal parts of portable control devices operating on circuits above 50 volts must be grounded by a grounding conductor in the control cable.

(6) Auto transformers or a.c. reactors must not be used to draw welding current directly from any a.c. power source having a voltage exceeding 80 volts.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-49005, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-49007 How must arc welding equipment be installed? Arc welding equipment, including the power supply, must be installed according to the requirements of chapter 296-306A WAC Part T.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-49007, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-49009 How must arc welding equipment be grounded? (1) The frame or case of the welding machine (except engine-driven machines) must be grounded according to the requirements of chapter 296-306A WAC Part T.

(2) Conduits containing electrical conductors must not be used for completing a work-lead circuit. Pipelines must

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not be used as a permanent part of a work-lead circuit, but may be used during construction, extension or repair if current is not carried through threaded joints, flanged bolted joints, or caulked joints and special precautions are used to avoid sparking at connection of the work-lead cable.

(3) Using chains, wire ropes, cranes, hoists, and elevators to carry welding current is prohibited.

(4) Where a structure, conveyor, or fixture is regularly used as a welding current return circuit, joints must be bonded or provided with adequate current collecting devices and appropriate periodic inspection should be conducted to ensure that no electrocution, shock, or fire hazard exists.

(5) All ground connections must be checked to determine that they are mechanically strong and electrically adequate for the required current.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-49009, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-49011 What requirements apply to supply connections and conductors? (1) A disconnecting switch or controller must be provided at or near each welding machine without a switch or controller mounted as an integral part of the machine. The switch must meet the requirements of chapter 296-306A WAC Part T. Overcurrent protection must be provided as specified in chapter 296-306A WAC Part T. A disconnect switch with overload protection or equivalent disconnect and protection means, permitted by chapter 296-306A WAC Part T must be provided for each outlet intended for connection to a portable welding machine.

(2) For individual welding machines, the rated current-carrying capacity of the supply conductors must be at least that of the rated primary current of the welding machines.

(3) For groups of welding machines, the rated current-carrying capacity of conductors may be less than the sum of the rated primary currents of the welding machines supplied. The conductor rating must be determined according to the machine loading based on the use to be made of each welding machine and the allowance permissible in the event that all the welding machines supplied by the conductors will not be in use at the same time.

(4) In operations involving several welders on one structure, d.c. welding process requirements may require the use of both polarities; or supply circuit limitations for a.c. welding may require distribution of machines among the phases of the supply circuit. In such cases, no load voltages between electrode holders will be two times normal in d.c. or 1, 1.4, 1.73, or 2 times normal on a.c. machines. Similar voltage differences will exist if both a.c. and d.c. welding are done on the same structure.

(a) All d.c. machines must be connected with the same polarity.

(b) All a.c. machines must be connected to the same phase of the supply circuit and with the same instantaneous polarity.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-49011, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-49013 How must arc welding equipment be operated? (1) Employees assigned to operate or maintain arc welding equipment must be acquaint-

ed with the requirements of WAC 296-306A-490, 296-306A-495, and 296-306A-500; if doing gas-shielded arc welding, also Recommended Safe Practices for Gas-Shielded Arc Welding, A6.1-1966, American Welding Society.

(2) Before starting operations, all connections to the machine must be checked to make certain they are properly made. The work lead must be firmly attached to the work; magnetic work clamps shall be freed from adherent metal particles of spatter on contact surfaces. Coiled welding cable must be spread out before use to avoid serious overheating and damage to insulation.

(3) You must ensure that the welding machine frame grounding is checked with special attention given to safety ground connections of portable machines.

(4) Cylinders must be kept away from radiators, piping systems, layout tables, etc., that may be used for grounding electric circuits. Any practice such as the tapping of an electrode against a cylinder to strike an arc is prohibited.

(5) There must be no leaks of cooling water, shielding gas or engine fuel.

(6) You must ensure that the machine has proper switching equipment for shutting down.

(7) Printed rules and instructions covering operation of equipment supplied by the manufacturers must be strictly followed.

(8) Electrode holders when not in use must be placed so that they cannot make electrical contact with persons, conducting objects, fuel or compressed gas tanks.

(9) Cables with splices within 10 feet of the holder are prohibited. The welder should not coil or loop welding electrode cable around parts of the body.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-49013, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-49015 How must arc welding equipment be maintained? (1) The operator should report any equipment defect or safety hazard to the supervisor and discontinue using the equipment until its safety is ensured. Repairs must be made only by qualified persons.

(2) Machines that have become wet must be thoroughly dried and tested before being used.

(3) Work and electrode lead cables should be frequently inspected for wear and damage. Cables with damaged insulation or exposed bare conductors must be replaced. Lengths of work and electrode cables must be joined by connecting means specifically intended for the purpose. The connecting means must have insulation adequate for the service conditions.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-49015, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-495 Fire prevention and protection.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-495, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-49501 What basic fire prevention precautions must be taken? For more information on these basic precautions and the special precautions of WAC 296-306A-49503, including fire protection and prevention

responsibilities of welders, cutters, their supervisors (including outside contractors), and management, see the Standard for Fire Prevention in Use of Cutting and Welding Processes, NFPA Standard 51B, 1962.

The basic precautions for fire prevention in welding or cutting work are:

(1) If the object to be welded or cut cannot readily be moved, all movable fire hazards in the vicinity must be taken to a safe place.

(2) If the object to be welded or cut cannot be moved and if all the fire hazards cannot be removed, then guards must be used to confine the heat, sparks, and slag, and to protect the fire hazards.

(3) If the requirements of this section cannot be met, then welding and cutting are prohibited.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-49501, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-49503 What special fire prevention precautions must be taken? When the nature of the work to be performed falls within the scope of WAC 296-306A-49501(2), certain additional precautions may be necessary:

(1) Wherever there are floor openings or cracks in the flooring that cannot be closed, precautions must be taken so that no readily combustible materials on the floor below will be exposed to sparks that drop through. The same precautions must be observed with regard to cracks or holes in walls, open doorways, and open or broken windows.

(2) Suitable fire extinguishing equipment must be maintained in a state of readiness for instant use. Such equipment may consist of pails of water, buckets of sand, hose, or portable extinguishers depending upon the nature and quantity of the combustible material exposed.

(3) The following requirements apply to fire watch:

(a) Fire watchers are required whenever welding or cutting is performed in locations where other than a minor fire might develop, or any of the following conditions exist:

(i) Appreciable combustible material, in building construction or contents, closer than 35 feet to the point of operation.

(ii) Appreciable combustibles are more than 35 feet away but are easily ignited by sparks.

(iii) Wall or floor openings within a 35-foot radius expose combustible material in adjacent areas including concealed spaces in walls or floors.

(iv) Combustible materials are adjacent to the opposite side of metal partitions, walls, ceilings, or roofs and are likely to be ignited by conduction or radiation.

(b) Fire watchers must have fire extinguishing equipment readily available and be trained in its use. They must be familiar with facilities for sounding an alarm in the event of a fire. They must watch for fires in all exposed areas, try to extinguish them only when obviously within the capacity of the equipment available, or otherwise sound the alarm. A fire watch must be maintained for at least a half hour after completion of welding or cutting operations to detect and extinguish possible smoldering fires.

(4) Before cutting or welding is permitted, the area must be inspected by the individual responsible for authorizing cutting and welding operations. The responsible individual must designate precautions to be followed in granting

authorization to proceed, preferably in the form of a written permit.

(5) Where combustible materials such as paper clippings, wood shavings, or textile fibers are on the floor, the floor must be swept clean for a radius of 35 feet. Combustible floors must be kept wet, covered with damp sand, or protected by fire-resistant shields. Where floors have been wet down, employees operating arc welding or cutting equipment must be protected from possible shock.

(6) Cutting and welding are prohibited in the following situations:

(a) In areas not authorized by management.

(b) In sprinklered buildings while such protection is impaired.

(c) In the presence of explosive atmospheres (mixtures of flammable gases, vapors, liquids, or dusts with air), or where explosive atmospheres may develop inside uncleaned or improperly prepared tanks or equipment that have previously contained such materials, or that may develop in areas with an accumulation of combustible dusts.

(d) In areas near the storage of large quantities of exposed, readily ignitable materials such as bulk sulphur, baled paper, or cotton.

(7) Where practical, all combustibles must be relocated at least 35 feet from the worksite. Where relocation is impractical, combustibles must be protected with flameproofed covers or otherwise shielded with metal or asbestos guards or curtains. Edges of covers at the floor should be tight to prevent sparks from going under them. This precaution is also important at overlaps where several covers are used to protect a large pile.

(8) Ducts and conveyor systems that might carry sparks to distant combustibles must be suitably protected or shut down.

(9) Where cutting or welding is done near walls, partitions, ceiling, or roof of combustible construction, fire-resistant shields or guards must be provided to prevent ignition.

(10) If welding is to be done on a metal wall, partition, ceiling, or roof, precautions must be taken to prevent ignition of combustibles on the other side, due to conduction or radiation, preferably by relocating combustibles. Where combustibles are not relocated, a fire watch on the opposite side from the work must be provided.

(11) Welding must not be attempted on a metal partition, wall, ceiling, or roof having a combustible covering nor on walls or partitions of combustible sandwich-type panel construction.

(12) Cutting or welding on pipes or other metal in contact with combustible walls, partitions, ceilings or roofs must not be undertaken if the work is close enough to cause ignition by conduction.

(13) You are responsible for the safe use of cutting and welding equipment on your property and:

(a) Based on fire potentials of plant facilities, you must establish areas and procedures for cutting and welding;

(b) You must designate an individual responsible for authorizing cutting and welding operations in areas not specifically designed for such processes;

(c) You must insist that cutters or welders and their supervisors are suitably trained in the safe operation of their equipment and the safe use of the process; and

(d) You must advise all contractors about flammable materials or hazardous conditions of which they may not be aware.

(14) The supervisor must:

(a) Ensure that cutting and welding equipment is handled and used safely.

(b) Determine the combustible materials and hazardous areas present or likely to be present in the work location.

(c) Protect combustibles from ignition by the following:

(i) Have the work moved to a location free from dangerous combustibles;

(ii) If the work cannot be moved, have the combustibles moved to a safe distance from the work or have the combustibles properly shielded against ignition; and

(iii) See that cutting and welding are so scheduled that plant operations that might expose combustibles to ignition are not started during cutting or welding.

(d) Secure authorization for the cutting or welding operations from the designated management representative.

(e) Determine that the cutter or welder secures their approval that conditions are safe before going ahead;

(f) Determine that fire protection and extinguishing equipment are properly located at the site; and

(g) Ensure fire watches are available at the site when required.

(15) Cutting or welding is permitted only in areas that are or have been made fire safe. Within the confines of an operating plant or building, cutting and welding should preferably be done in a specific area designed for such work, such as a maintenance shop or a detached outside location. Such areas should be of noncombustible or fire-resistive construction, essentially free of combustible and flammable contents, and suitably segregated from adjacent areas. When work cannot be moved practically, as in most construction work, the area must be made safe by removing combustibles or protecting combustibles from ignition sources.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-49503, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-49505 What precautions must be taken when welding or cutting containers? (1) No welding, cutting, or other hot work may be performed on used drums, barrels, tanks or other containers until they have been cleaned thoroughly enough to be certain that there are no flammable materials present or any substances such as greases, tars, acids, or other materials which when subjected to heat, might produce flammable or toxic vapors. Any pipe lines or connections to the drum or vessel must be disconnected or blanked.

(2) All hollow spaces, cavities, or containers must be vented to permit the escape of air or gases before preheating, cutting or welding. Purging with inert gas is recommended.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-49505, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-49507 What precautions must be taken when welding in confined spaces? (1) When arc welding work is stopped for a substantial time, such as during lunch or overnight, all electrodes must be removed from the holders and the holders carefully located so that

accidental contact cannot occur and the machine be disconnected from the power source.

(2) In order to eliminate the possibility of gas escaping through leaks or improperly closed valves, when gas welding or cutting, the torch valves must be closed and the gas supply to the torch positively shut off at some point outside the confined area whenever the torch is not to be used for a substantial period of time, such as during lunch hour or overnight. Where practical, the torch and hose must also be removed from the confined space.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-49507, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-500 Protection of employees.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-500, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-50001 How must eye protection be selected? (1) Helmets or hand shields must be used during all arc welding or arc cutting operations, excluding submerged arc welding. Goggles should also be worn during arc welding or cutting operations to provide protection from injurious rays from adjacent work, and from flying objects. The goggles may have either clear or colored glass, depending on the amount of exposure to adjacent welding operations. Helpers or attendants must have proper eye protection.

(2) Goggles or other suitable eye protection must be used during all gas welding or oxygen cutting operations. Spectacles without side shields, with suitable filter lenses are permitted for use during gas welding operations on light work, for torch brazing, or for inspection.

(3) All operators and attendants of resistance welding or resistance brazing equipment must use transparent face shields or goggles, depending on the job, to protect their faces or eyes as required.

(4) Suitable goggles must be provided where needed for brazing operations not above.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-50001, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-50003 What specifications must eye protection meet? (1) Helmets and hand shields must be made of a material that is an insulator for heat and electricity. Helmets, shields and goggles must be not readily flammable and must be able to be sterilized.

(2) Helmets and hand shields must be arranged to protect the face, neck and ears from direct radiant energy from the arc.

(3) Helmets must have filter plates and cover plates designed for easy removal.

(4) All parts must be constructed of a material that will not readily corrode or discolor the skin.

(5) Goggles must be ventilated to prevent fogging of the lenses as much as practical.

(6) Cover lenses or plates should be provided to protect each helmet, hand shield, or goggle filter lens or plate.

(7) All glass for lenses must be tempered, substantially free from scratches, air bubbles, waves and other flaws. Except when a lens is ground to provide proper optical

correction for defective vision, the front and rear surfaces of lenses and windows must be smooth and parallel.

(8) Lenses must be marked with the source and shade.

(9) Following is a guide to select proper shade numbers. Individual needs may vary.

Welding Operation	Shade No.
Shielded metal-arc welding—1/16-, 3/32-, 1/8-, 5/32-inch electrodes	10
Gas-shielded arc welding (nonferrous)—1/16-, 3/32-, 1/8-, 5/32-inch electrodes	11
Gas-shielded arc welding (ferrous)—1/16-, 3/32-, 1/8-, 5/32-inch electrodes	12
Shielded metal-arc welding: 3/16-, 7/32-, 1/4-inch electrodes	12
5/16-, 3/8-inch electrodes	14
Atomic hydrogen welding	10-14
Carbon arc welding	14
Soldering	2
Torch brazing	3 or 4
Light cutting, up to 1 inch	3 or 4
Medium cutting, 1 inch to 6 inches	4 or 5
Heavy cutting, 6 inches and over	5 or 6
Gas welding (light) up to 1/8 inch	4 or 5
Gas welding (medium) 1/8 inch to 1/2 inch	5 or 6
Gas welding (heavy) 1/2 inch and over	6 or 8

Note: In gas welding or oxygen cutting where the torch produces a high yellow light it is desirable to use a filter or lens that absorbs the yellow or sodium line in the visible light of the operation.

(10) All filter lenses and plates must meet the test for transmission of radiant energy prescribed in ANSI Z 87.1-1968—American National Standard Practice for Occupational and Educational Eye and Face Protection.

(11) Where the work permits, an arc welder should be enclosed in an individual booth painted with a finish of low-reflectivity such as zinc oxide (an important factor for absorbing ultraviolet radiations) and lamp black, or must be enclosed with noncombustible screens similarly painted. Booths and screens must permit circulation of air at floor level. Employees or other persons adjacent to the welding areas must be protected from the rays by noncombustible or flameproof screens or shields or must be required to wear appropriate goggles.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-50003, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-50005 What protective clothing must welders wear? (1) Employees exposed to the hazards created by welding, cutting, or brazing operations must be protected by personal protective equipment according to the requirements of chapter 296-306A WAC Part H. Appropriate protective clothing required for any welding operation will vary with the size, nature and location of the work to be performed.

(2) The following suggestions may be helpful when choosing protective clothing:

(a) Except when engaged in light work, all welders should wear flameproof gauntlet gloves.

(b) Flameproof aprons made of leather, asbestos, or other suitable material may help to protect against radiated heat and sparks.

(c) Woolen clothing is better than cotton because it is less easily ignited and helps to protect the welder from changes in temperature. Cotton clothing, if used, should be chemically treated to reduce its combustibility. All outer clothing such as jumpers or overalls should be reasonably free from oil or grease.

(d) Sparks may lodge in rolled-up sleeves, pockets, or cuffs. Therefore sleeves and collars should be buttoned, and clothing should have no front pockets. Trousers or overalls should be uncuffed.

(e) For heavy work, fire-resistant leggings, high boots, or other equivalent means should be used.

(f) In production work a sheet metal screen in front of the employee's legs can provide further protection against sparks and molten metal in cutting operations.

(g) Capes or shoulder covers made of leather or other suitable materials should be worn during overhead welding or cutting operations. Leather skull caps may be worn under helmets to prevent head burns.

(h) For welding and cutting overhead or in extremely confined spaces, ear protection is sometimes desirable.

(i) Where there is exposure to sharp or heavy falling objects, or a hazard of bumping in confined spaces, hard hats or head protectors must be used.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-50005, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-50007 What other requirements apply to employee protection? (1) You must ensure that a welder or helper working on platforms, scaffolds, or runways is protected against falling by using railings, safety belts, life lines, or other equally effective safeguards.

(2) Welders must place welding cable and other equipment so that it is clear of passageways, ladders, and stairways.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-50007, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-50009 What employee protection must be provided in confined spaces? "Confined space" means a relatively small or restricted space such as a tank, boiler, pressure vessel, or small compartment of a ship.

(1) Confined spaces must be ventilated. For ventilation requirements see WAC 296-306A-50011 through 296-306A-50029.

(2) When welding or cutting in a confined space, the gas cylinders and welding machines must be left outside. Before operations are started, heavy portable equipment mounted on wheels must be securely blocked to prevent accidental movement.

(3) Where a welder must enter a confined space through a manhole or other small opening, means must be provided for quickly removing the welder in case of emergency. When safety belts and lifelines are used, they must be attached so that the welder's body cannot be jammed in a small exit opening. An attendant with a preplanned rescue procedure must be stationed outside to observe the welder at all times and be able to put rescue operations into effect.

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(4) After welding operations are completed, the welder must mark the hot metal or provide some other means of warning other employees.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-50009, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-50011 What general requirements apply to welding ventilation? (1) The following three factors in arc and gas welding must be considered when determining the amount of contamination to which welders may be exposed:

(a) Dimensions of space in which welding is to be done (especially ceiling height);

(b) Number of welders; and

(c) The possibility of hazardous fumes, gases, or dust according to the metals involved.

(2) Other factors involved may require ventilation or respiratory protective devices as needed to meet the requirements of this section. Such factors include:

(a) Atmospheric conditions;

(b) Heat generated; and

(c) Presence of volatile solvents.

(3) When welding must be performed in a space entirely screened on all sides, the screens must be arranged so that no serious restriction of ventilation exists. The screens should be mounted so that they are about 2 feet above the floor unless the work is performed at so low a level that the screen must be extended nearer to the floor to protect nearby employees from the glare of welding.

(4) Local exhaust or general ventilating systems must be provided and arranged to keep the amount of toxic fumes, gases, or dusts below the maximum allowable in chapter 296-62 WAC.

Note: A number of potentially hazardous materials are employed in fluxes, coatings, coverings, and filler metals used in welding and cutting or are released to the atmosphere during welding and cutting. These include but are not limited to the materials itemized in WAC 296-306A-50019 through 296-306A-50029.

(5) You must determine which potentially hazardous materials are associated with welding and cutting and inform employees through signs, labels or other appropriate means.

(a) Welding may produce fumes and gases hazardous to health. Avoid breathing these fumes and gases. Use adequate ventilation. See ANSI Z 49.1-1967, Safety in Welding and Cutting, published by the American Welding Society.

(b) Brazing (welding) filler metals containing cadmium in significant amounts must carry the following notice on tags, boxes, or other containers:

WARNING
CONTAINS CADMIUM—POISONOUS FUMES MAY BE FORMED
ON HEATING

• Do not breathe fumes. Use only with adequate ventilation such as fume collectors, exhaust ventilators, or air-supplied respirators. See ANSI Z 49.1-1967.

• If chest pain, cough, or fever develops after use call physician immediately.

• Keep children away when using.

(c) Brazing and gas welding fluxes containing fluorine compounds must have a cautionary wording to indicate that

they contain fluorine compounds. The American Welding Society recommends the following for brazing and gas welding fluxes:

**CAUTION
CONTAINS FLUORIDES**

This flux when heated gives off fumes that may irritate eyes, nose and throat.

- Avoid fumes. Use only in well-ventilated spaces.
- Avoid contact of flux with eyes or skin.
- Do not take internally.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-50011, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-50013 What ventilation must be provided for general welding and cutting? (1) Mechanical ventilation must be provided when welding or cutting is done on metals not covered in WAC 296-306A-50019 through 296-306A-50029 in the following locations:

- (a) In a space of less than 10,000 cubic feet per welder.
- (b) In a room with a ceiling height of less than 16 feet.
- (c) In confined spaces or where the welding space contains partitions, balconies, or other structural barriers to the extent that they significantly obstruct cross-ventilation.

(2) Ventilation must be at the minimum rate of 2,000 cubic feet per minute per welder.

Exception: This requirement does not apply where local exhaust hoods and booths that meet the requirements of WAC 296-306A-50015, or airline respirators approved by the Mine Safety and Health Administration (MSHA) and the National Institute for Occupational Safety and Health (NIOSH) for such purposes are provided. Natural ventilation is considered sufficient for welding or cutting operations where the restrictions in subsection (1) of this section are not present.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-50013, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-50015 What requirements apply to local exhaust hoods and booths? Mechanical local exhaust ventilation may be provided by either of the following:

(1) Freely movable hoods intended to be placed by the welder as near as practical to the work being welded and provided with a rate of airflow sufficient to maintain a velocity in the direction of the hood of 100 linear feet per minute in the zone of welding when the hood is at its most remote distance from the point of welding. The rates of ventilation required to accomplish this control velocity using a 3-inch wide flanged suction opening are shown in the following table:

Welding zone	Minimum air flow cubic feet/minutes	Duct diameter inches
4 to 6 inches from arc or torch	150	3
6 to 8 inches from arc or torch	275	3-1/2
8 to 10 inches from arc or torch	425	4-1/2
10 to 12 inches from arc or torch	600	5-1/2

- 1 When brazing with cadmium bearing materials or when cutting on such materials increased rates of ventilation may be required.
- 2 Nearest half-inch duct diameter based on 4,000 feet per minute velocity in pipe.

(2) A fixed enclosure with a top and at least two sides that surround the welding or cutting operations and with a rate of airflow sufficient to maintain a velocity away from the welder of not less than 100 linear feet per minute.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-50015, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-50017 What ventilation must be provided in confined spaces? (1) All welding and cutting operations carried on in confined spaces must be adequately ventilated to prevent the accumulation of toxic materials or possible oxygen deficiency. This applies to welders, helpers, and other employees in the immediate vicinity. All replacement air must be clean and respirable.

(2) In circumstances where it is impossible to provide such ventilation, airline respirators or hose masks approved by the Mine Safety and Health Administration (MSHA) and the National Institute for Occupational Safety and Health (NIOSH) for this purpose must be used.

(3) In areas immediately hazardous to life, hose masks with blowers or self-contained breathing equipment must be used. The breathing equipment must be approved by the Mine Safety and Health Administration (MSHA) and the National Institute for Occupational Safety and Health (NIOSH).

(4) Where welding operations are carried on in confined spaces and where welders and helpers are provided with hose masks, hose masks with blowers or self-contained breathing equipment approved by the Mine Safety and Health Administration (MSHA) and the National Institute for Occupational Safety and Health (NIOSH), an employee must be stationed on the outside of such confined spaces to ensure the safety of those working within.

(5) Oxygen must not be used for ventilation.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-50017, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-50019 What requirements apply to welding fluorine compounds? In confined spaces, welding or cutting involving fluxes, coverings, or other materials that contain fluorine compounds must be done according to WAC 296-306A-50017.

"Fluorine compound" means a compound that contains fluorine as an element in chemical combination, not as a free gas.

Note: The need for local exhaust ventilation or airline respirators for welding or cutting in other than confined spaces will depend on the circumstances. However, such protection is desirable for fixed-location production welding and for all production welding on stainless steels. Where air samples taken at the welding location indicate that the fluorides liberated are below the maximum allowable concentration, such protection is not necessary.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-50019, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-50021 What requirements apply to welding zinc? (1) In confined spaces welding or cutting

involving zinc-bearing base or filler metals or metals coated with zinc-bearing materials must be done according to WAC 296-306A-50017.

(2) Indoors, welding or cutting involving zinc-bearing base or filler metals coated with zinc-bearing materials must be done according to WAC 296-306A-50015.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-50021, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-50023 What requirements apply to welding lead? (1) In confined spaces, welding involving lead-base metals (erroneously called lead-burning) must be done according to WAC 296-306A-50017.

(2) Indoors, welding involving lead-base metals must be done according to WAC 296-306A-50015.

(3) In confined spaces or indoors, welding or cutting involving metals containing lead, other than as an impurity, or involving metals coated with lead-bearing materials, including paint, must be done using local exhaust ventilation or airline respirators. Outdoors, such operations must be done using respiratory protective equipment approved by the Mine Safety and Health Administration (MSHA) and the National Institute for Occupational Safety and Health (NIOSH) for such purposes. In all cases, employees in the immediate vicinity of the cutting operation must be protected as necessary by local exhaust ventilation or airline respirators.

Note: See chapter 296-62 WAC for additional requirements on lead.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-50023, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-50025 What requirements apply to welding beryllium? Welding or cutting indoors, outdoors, or in confined spaces involving beryllium-containing base or filler metals must be done using local exhaust ventilation and airline respirators unless atmospheric tests under the most adverse conditions have established that employee exposure is within the acceptable concentrations defined by chapter 296-62 WAC. In all cases, employees in the immediate vicinity of the welding or cutting operations must be protected as necessary by local exhaust ventilation or airline respirators.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-50025, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-50027 What requirements apply to welding cadmium? (1) Welding or cutting indoors or in confined spaces involving cadmium-bearing or cadmium-coated base metals must be done using local exhaust ventilation or airline respirators unless atmospheric tests under the most adverse conditions have established that employee exposure is within the acceptable concentrations defined by chapter 296-62 WAC. Outdoors, such operations must be done using respiratory protective equipment such as fume respirators approved by the Mine Safety and Health Administration (MSHA) and the National Institute for Occupational Safety and Health (NIOSH) for such purposes.

(2) Welding (brazing) involving cadmium-bearing filler metals must be done using ventilation as prescribed in WAC

296-306A-50015 or 296-306A-50017 if the work is to be done in a confined space.

Note: See chapter 296-62 WAC for additional requirements on cadmium.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-50027, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-50029 What requirements apply to welding mercury? Welding or cutting indoors or in a confined space involving metals coated with mercury-bearing materials, including paint, must be done using local exhaust ventilation or airline respirators unless atmospheric tests under the most adverse conditions have established that employee exposure is within the acceptable concentrations defined by chapter 296-62 WAC. Outdoors, such operations must be done using respiratory protective equipment approved by the Mine Safety and Health Administration (MSHA) and the National Institute for Occupational Safety and Health (NIOSH) for such purposes.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-50029, filed 10/31/96, effective 12/1/96.]

Part W

Powered Industrial Trucks (Forklifts)

WAC 296-306A-520 Powered industrial trucks (forklifts).

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-520, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-52001 What does this section cover? WAC 296-306A-520 applies to all powered industrial trucks used in agricultural operations.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-52001, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-52003 What is a "powered industrial truck"? "Powered industrial truck" (or "truck") means a fork truck, industrial tractor, platform lift truck, motorized hand truck, or other specialized industrial trucks, powered by electric motors or internal combustion engines. The definition does not include compressed gas-operated industrial trucks, farm vehicles, or vehicles intended primarily for earth moving or over-the-road hauling.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-52003, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-52005 What manufacturer's requirements apply to powered industrial trucks? (1) All powered industrial trucks must meet the design and construction requirements for powered industrial trucks established in the ANSI B56.1-1969, "Powered Industrial Trucks."

(2) Approved trucks must have a label indicating approval by the testing laboratory as meeting the specifications and requirements of ANSI B56.1-1969.

(3) Modifications or additions must only be performed with the manufacturer's prior written approval. When modifications or additions are made, capacity, operation, and

maintenance instruction plates, tags, or decals must be changed accordingly.

(4) If the truck is equipped with front-end attachments other than factory installed attachments, it shall be marked to identify the attachments and show the approximate weight of the truck and attachment combination at maximum elevation with the load centered from side to side.

(5) The user must ensure that all nameplates and markings are in place and legible.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-52005, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-52007 What are the classifications of powered industrial trucks? Powered industrial trucks are identified according to the following classifications:

(1) "D" units are similar to G units except that they are diesel engine powered instead of gasoline engine powered.

(2) "DS" units are diesel powered units with additional safeguards to the exhaust, fuel, and electrical systems. They may be used in some locations where a D unit may not be considered suitable.

(3) "DY" units are diesel powered units that have all the safeguards of the DS units; in addition, they do not have any electrical equipment, including the ignition, and are equipped with temperature limitation features.

(4) "E" units are electrically powered units with minimum acceptable safeguards against inherent fire hazards.

(5) "ES" units are electrically powered units that, in addition to all of the requirements for the E units, are provided with additional safeguards to the electrical system to prevent emission of hazardous sparks and to limit surface temperatures. They may be used in some locations where the use of an E unit may not be considered suitable.

(6) "EE" units are electrically powered units that have, in addition to all of the requirements for the ES units, electric motors and all other electrical equipment completely enclosed. The EE unit may be used where the use of an E or ES unit may not be considered suitable.

(7) "EX" units are electrically powered units that differ from E, ES, or EE units in that the electrical fittings and equipment are so designed, constructed, and assembled that the units may be used in certain atmospheres containing flammable vapors or dusts.

(8) "G" units are gasoline powered units having minimum acceptable safeguards against inherent fire hazards.

(9) "GS" units are gasoline powered units with additional safeguards to the exhaust, fuel, and electrical systems. They may be used in some locations where the use of a G unit may not be considered suitable.

(10) "LP" units are similar to G units except that LP-gas is used for fuel instead of gasoline.

(11) "LPS" units are LP-gas powered units with additional safeguards to the exhaust, fuel, and electrical systems. They may be used in some locations where the use of an LP unit may not be considered suitable.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-52007, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-52009 What must a user consider before choosing a powered industrial truck? Before choosing the industrial truck to use, the user must determine

whether the atmosphere or location is hazardous or nonhazardous. The type of industrial truck shall be chosen according to the requirements of WAC 296-306A-52011.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-52009, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-52011 What requirements determine which trucks to use in specific hazardous environments? Following are the minimum truck types required in specific hazardous environments. You may choose to use industrial trucks having greater safeguards.

(1) Powered industrial trucks are prohibited in atmospheres with a hazardous concentration of acetylene, butadiene, ethylene oxide, hydrogen (or gases or vapors equivalent in hazard to hydrogen, such as manufactured gas), propylene oxide, acetaldehyde, cyclopropane, diethyl ether, ethylene, isoprene, or unsymmetrical dimethyl hydrazine (UDMH).

(a) Approved EX trucks must be used in atmospheres containing hazardous concentrations of metal dust, including aluminum, magnesium, and their commercial alloys; other metals of similarly hazardous characteristics; or in atmospheres containing carbon black, coal, or coke dust.

(b) In atmospheres where dust of magnesium, aluminum or aluminum bronze may be present, fuses, switches, motor controllers, and circuit breakers of trucks must have enclosures specifically approved for such locations.

(2) Approved EX trucks must be used in atmospheres containing acetone, acrylonitrile, alcohol, ammonia, benzene, bensol, butane, ethylene dichloride, gasoline, hexane, lacquer solvent vapors, naphtha, natural gas, propane, propylene, styrene, vinyl acetate, vinyl chloride, or xylenes in quantities sufficient to produce explosive or ignitable mixtures.

(3) Approved DY, EE, or EX trucks must be used in locations where volatile flammable liquids or flammable gases are handled, processed or used, if the hazardous liquids, vapors or gases are normally confined within closed containers or closed systems from which they can escape only in case of accidental rupture or breakdown, or in case of abnormal equipment operation.

Approved DY, EE, or EX trucks may also be used in locations in which hazardous concentrations of gases or vapors are normally prevented by mechanical ventilation but that might become hazardous through failure or abnormal operation of the ventilating equipment.

(4) Approved DS, ES, GS, or LPS trucks must be used in locations used for the storage of hazardous liquids in sealed containers or liquefied or compressed gases in containers. This classification includes locations where volatile flammable liquids or flammable gases or vapors are used but are hazardous only in case of an accident or an unusual operation condition.

The quantity of hazardous material that might escape in case of accident, the adequacy of ventilating equipment, the total area involved, and the business's history of explosions or fires are all factors that should be considered in determining which truck has sufficient safeguards for the location.

(a) Approved EX trucks must be used in atmospheres in which combustible dust is or may be suspended in quantities sufficient to produce explosive or ignitable mixtures, or

where mechanical failure or abnormal operation of machinery or equipment might cause such mixtures to be produced.

(b) The EX classification usually includes the working areas of: Grain handling and storage plants, rooms containing grinders or pulverizers, cleaners, graders, scalpers, open conveyors or spouts, open bins or hoppers, mixers or blenders, automatic or hopper scales, packing machinery, elevator heads and boots, stock distributors, dust and stock collectors (except all-metal collectors vented to the outside), and all similar dust producing machinery and equipment in grain processing plants, starch plants, sugar pulverizing plants, malting plants, hay grinding plants, and other similar locations; and areas where combustible dust may, under normal operating conditions, be present in the air in quantities sufficient to produce explosive or ignitable mixtures.

(5) Approved DY, EE, or EX trucks must be used in atmospheres in which deposits or accumulations of combustible dust may be ignited by arcs or sparks from the truck, if combustible dust will not normally be suspended or thrown into suspension by the normal operation of equipment or apparatus in quantities sufficient to produce explosive or ignitable mixtures.

(6) Approved DY, EE, or EX trucks must be used in locations with easily ignitable fibers or flyings if the fibers or flyings are not likely to be suspended in quantities sufficient to produce ignitable mixtures.

(7) Approved DS, DY, ES, EE, EX, GS, or LPS trucks must be used in locations, including outside storage, where easily ignitable fibers are stored or handled, but are not processed or manufactured. E trucks that have been previously used in these locations may continue to be used.

(8) If storage warehouses and outside storage locations are hazardous, the specified approved truck must be used. If not classified as hazardous, any approved D, E, G, or LP truck may be used, or trucks meeting the requirements for these types may be used.

**The Uses of Industrial Trucks in Hazardous Locations
Unclassified & Class I**

Classes	Unclassified	Class I locations			
Description of classes	Locations not possessing atmospheres as described in other columns	Locations in which flammable gases or vapors are, or may be, present in the air in quantities sufficient to produce explosive or ignitable mixtures			
Groups in classes	None	A	B	C	D
Examples of locations or atmospheres in classes and groups	Piers and wharves, inside and outside general storage, general industrial or commercial properties	Acetylene	Hydrogen	Ethyl ether	Gasoline Naphtha Alcohols Acetone Lacquer solvent Benzene
		1		2	
Divisions (nature of hazardous conditions)	None	Above condition exists continuously, intermittently, or periodically under normal operating conditions		Above condition may occur accidentally due to a puncture of a storage drum	

Class II & III

Classes	Class II location			Class III locations	
Description of classes	Locations that are hazardous because of the presence of combustible dust			Locations where easily ignitable fibers or flyings are present but not likely to be in suspension in quantities sufficient to produce ignitable mixtures	
Groups in classes	E	F	G	None	
Examples of locations or atmospheres in classes and groups	Metal dust Coal dust Coke dust	Carbon black Starch dust Organic dust	Grain dust Flour dust	Baled waste, cocoa fiber, cotton, excelsior, hemp, istle, jute, kapok, oakum, sisal, Spanish moss, synthetic fibers, tow.	
	1		2	1	2
Divisions (nature of hazardous conditions)	Explosive mixture may be present under normal operating conditions, or where failure of equipment may cause the condition to exist simultaneously with arcing or sparking of electrical equipment, or where dusts of an electrically conducting nature may be present		Explosive mixture not normally present, but where deposits of dust may cause heat rise in electrical equipment, or where such deposits may be ignited by arcs or sparks from electrical equipment	Locations in which easily ignitable fibers or materials producing combustible flyings are handled, manufactured, or used	Locations in which easily ignitable fibers are stored or handled (except in the process of manufacture)

Groups in classes--None, A, B, C, and D

Groups in classes	None	A	B	C	D	A	B	C	D
Types of trucks authorized:									
Diesel:									
Type D	D*								
Type DS									DS
Type DY									DY
Electric:									
Type E	E*								
Type ES									ES
Type EE									EE
Type EX					EX				EX
Gasoline:									
Type G	G*								
Type GS									GS
LP-Gas:									
Type LP	LP*								
Type LPS									LPS

*These types of trucks may also be used.

Groups in class--E, F, G, and None

Groups in classes	E	F	G	E	F	G	None	None
Types of trucks authorized:								
Diesel:								
Type D								
Type DS						DS		DS
Type DY						DY	DY	DY
Electric:								
Type E								E
Type ES						ES		ES
Type EE						EE	EE	EE
Type EX		EX	EX			EX	EX	EX
Gasoline:								
Type G								
Type GS						GS		GS
LP-Gas:								
Type LP								
Type LPS						LPS		LPS

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-52011, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-52013 In what environments may converted trucks be used? When powered industrial trucks that were originally approved to use gasoline are converted to use LP-gas according to WAC 296-306A-52047(12), they may be used in locations where G, GS or LP, and LPS trucks are specified.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-52013, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-52015 What requirements apply to overhead safety guards? (1) High-lift rider trucks must be fitted with an overhead guard manufactured according to WAC 296-306A-52005(1), unless operating conditions do not permit.

(2) An overhead guard must be used as protection against falling objects.

Note: An overhead guard is intended to offer protection from the impact of small packages, boxes, bagged material, and other objects involved in the job, but not to withstand the impact of a falling capacity load.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-52015, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-52017 What requirements apply to load backrests? (1) A load backrest extension must be used whenever necessary to minimize the possibility of the load or part of it from falling rearward.

(2) If the type of load presents a hazard, the user must equip fork trucks with a vertical load backrest extension manufactured according to WAC 296-306A-52005(1).

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-52017, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-52019 What requirements apply to fuel handling and storage? (1) You must ensure that liquid fuels such as gasoline and diesel fuel are stored and handled according to NFPA Flammable and Combustible Liquids Code (NFPA No. 30-1969).

(2) You must ensure that LP-gas fuel is stored and handled according to NFPA Storage and Handling of Liquefied Petroleum Gases (NFPA No. 58-1969).

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-52019, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-52021 What requirements apply to lighting for operating areas? (1) Adequate lighting should be provided in operating areas. (See ANSI Practice for Industrial Lighting, All.1-1965 (R1970).)

(2) Where general lighting is inadequate, directional lighting must be provided on the truck.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-52021, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-52023 What level of carbon monoxide gas is allowed? Concentration levels of carbon monoxide gas created by truck operations must not exceed the levels specified in WAC 296-62-075 (general occupational health standards).

Note: Questions concerning degree of concentration and methods of sampling should be referred to a qualified industrial hygienist.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-52023, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-52025 What requirements apply to dockboards (bridge plates)? (1) Portable and powered dockboards must be strong enough to support the load carried on them.

(2) Portable dockboards must be secured in position, either by anchors or anti-slipping devices.

(3) Powered dockboards must meet the design and construction requirements of Commercial Standard CS202-56 (1956) "Industrial Lifts and Hinged Loading Ramps" published by the U.S. Department of Commerce.

(4) Dockboard or bridge plates must be driven over carefully and slowly and their rated capacity never exceeded.

(5) Portable dockboards must have handholds for safe handling.

(6) Railroad cars must be kept stationary while dockboards or bridge plates are in position.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-52025, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-52027 What rules apply to loading trucks, trailers, and railroad cars with powered industrial trucks? (1) Wheel stops or other positive protection must be provided to prevent railroad cars from moving during loading or unloading.

(2) Fixed jacks may be necessary to support a semi-trailer and prevent up-ending during loading or unloading if the trailer is not coupled to a tractor.

(3) Many truck-trailers are equipped with a rear-end protection device to prevent cars from wedging underneath during a collision. These protection devices must be used with equipment that secures the truck-trailer to the loading dock. Wheel chocks are not required under the following conditions:

(a) Trucks or trailers are secured to the loading dock with a mechanical system that prevents movement away from the dock during loading, unloading, and boarding.

(b) All of the mechanical equipment is installed, maintained, and used as recommended by the manufacturer.

(c) Any damaged mechanical equipment is removed from service immediately and is not used to secure trucks and trailers.

(4) The flooring of trucks, trailers, and railroad cars must be checked for breaks and weakness before use.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-52027, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-52029 Who may operate powered industrial trucks? You must only allow trained and authorized operators to operate powered industrial trucks. You must provide training in the safe operation of powered industrial trucks to employee-operators.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-52029, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-52031 What requirements apply to operating powered industrial trucks? (1) No operator may drive a truck up to anyone standing in front of a fixed object.

(2) No one may stand or pass under the elevated portion of any truck, whether loaded or empty.

(3) Only authorized personnel may ride on powered industrial trucks. The truck must have a safe place to ride when riding is authorized.

(4) You must prohibit employees from placing their arms or legs between the uprights of the mast or outside the running lines of the truck.

(5) When an operator leaves a powered industrial truck unattended:

- (a) The load must be fully lowered;
- (b) The controls must be neutralized;
- (c) The power must be shut off; and
- (d) The brakes must be set.

(e) If the truck is parked on an incline, the wheels must be blocked.

A powered industrial truck is "unattended" when the operator is 25 feet or more away from the vehicle, which remains in view, or whenever the operator leaves the vehicle and it is not in view.

(6) When a truck operator is dismounted, within 25 feet of the truck, and still in view, the load must be fully lowered, the controls must be neutralized, and the brakes must be set to prevent movement.

(7) The operator must maintain a safe distance from the edge of ramps or platforms while operating on any elevated dock, or platform or freight car.

(8) There must be enough headroom for trucks to operate under overhead installations, lights, pipes, sprinkler systems, or other overhead projections.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-52031, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-52033 When may trucks be used to open or close freight car doors? Trucks may only be used for opening or closing freight car doors with an approved device that meets the following requirements:

(1) The door opening or closing device requires that the force applied by the device to the door is parallel to the door travel.

(2) The truck operator is trained in the use of the door opening or closing device and keeps the operation in full view while opening and closing.

(3) The area is clear of people while the door is moved with a device.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-52033, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-52035 What requirements apply to lifting employees on the forks of trucks? Employees may be lifted on the lifting carriage or forks of a powered industrial truck under the following conditions:

(1) The truck is equipped with vertical only, or vertical and horizontal controls elevatable with the lifting carriage or forks.

(2) A safety platform is firmly secured to the lifting carriage and/or forks.

(3) Employees on the platform have a mechanism to shut off power to the truck.

(4) Employees on the platform are protected from falling objects according to the operating conditions.

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[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-52035, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-52037 What requirements apply to using platforms for hoisting employees? A platform built specifically for hoisting people may be used to lift employees when:

(1) The platform is securely attached to the forks and has standard guardrails and toeboards installed on all sides.

(2) The hydraulic system is designed so that the lift mechanism will not drop faster than 135 feet per minute in the event of a failure in any part of the system. Forklifts used for elevating work platforms are identified as meeting this requirement.

(3) A safety strap is installed or the control lever is locked to prevent the boom from tilting.

(4) An operator attends the lift equipment while employees are on the platform.

(5) The operator is in the normal operating position while raising or lowering the platform.

(6) The vehicle remains stationary while employees are on the platform.

Exception: Inching or maneuvering at very slow speed is permissible.

(7) The area between employees on the platform and the mast is adequately guarded to prevent contact with chains or other shear points.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-52037, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-52039 What requirements apply to traveling in a powered industrial truck? (1) The operator must maintain a safe distance of approximately three truck lengths from the truck ahead. The truck must be kept under control at all times.

(2) The operator must yield the right of way to ambulances, fire trucks, or other vehicles in emergency situations.

(3) Passing other trucks traveling in the same direction at intersections, blind spots, or other dangerous locations is prohibited.

(4) Railroad tracks must be crossed diagonally wherever possible. The operator must not park closer than 8 feet from the center of railroad tracks.

(5) The operator must look in the direction of, and keep a clear view of, the path of travel.

(6) Stunt driving and horseplay are prohibited.

(7) The operator must approach elevators slowly, and then enter squarely after the elevator car is properly leveled. Once on the elevator, the operator must neutralize controls, shut off power, and set the brakes.

(8) Motorized hand trucks must enter elevator or other confined areas with load end forward.

(9) The operator must avoid running over loose objects on the roadway surface.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-52039, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-52041 What requirements apply to traveling speeds of powered industrial trucks? (1) The operator must observe all traffic regulations, including authorized plant speed limits.

(2) The operator must slow down and sound the horn at cross aisles and other locations where vision is obstructed. If the load obstructs a forward view, the driver must travel with the load trailing.

Exception: If traveling with the load trailing creates new hazards, it is not required.

(3) The operator must ascend and descend grades slowly.

(a) At grades over 10 percent, loaded trucks must be driven with the load upgrade.

(b) Unloaded trucks should be operated on all grades with the load carrier downgrade.

(c) On all grades the load and load carrier must be tilted back if applicable, and raised only as far as necessary to clear the road surface.

(4) Under all travel conditions, the truck must be operated at a speed that will permit it to be stopped safely.

(5) The driver must slow down for wet and slippery floors.

(6) While negotiating turns, the operator must slow to a safe speed and turn the wheel in a smooth, sweeping motion.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-52041, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-52043 What requirements apply to loading powered industrial trucks? (1) All loads must be stable or safely arranged. Exercise caution when handling off-center loads that cannot be centered.

(2) All loads must be within the rated capacity of the truck.

(3) Take care securing, manipulating, positioning, and transporting loads when attachments are used. Trucks with attachments must be operated as partially loaded trucks when not handling a load.

(4) Place the load carrier under the load as far as possible. Tilt the mast backward to stabilize the load.

(5) Use extreme care when tilting the load forward or backward, particularly when high tiering. Avoid tilting the load forward with the load carrier elevated except to pick up a load, or when the load is in a deposit position over a rack or stack. When stacking or tiering, use only enough backward tilt to stabilize the load.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-52043, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-52045 What requirements apply to servicing powered industrial trucks? (1) Powered industrial trucks that need repairs, are defective, or in any way unsafe must be taken out of service until restored to safe operating condition.

(2) Stop the engine before filling fuel tanks. Avoid spilling fuel.

(3) When oil or fuel spills, wash the spill away carefully or evaporate the spill completely and replace the fuel tank cap before restarting engine.

(4) No truck may be operated with a leak in the fuel system.

(5) Open flames are prohibited for checking electrolyte level in storage batteries or gasoline level in fuel tanks.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-52045, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-52047 What requirements apply to maintaining powered industrial trucks? (1) Powered industrial trucks must be removed from service when not in safe operating condition. All repairs must be made by an authorized employee.

(2) No repairs may be made in Class I, II, and III locations.

(3) When repairs to fuel and ignition systems of industrial trucks involve fire hazards, the repairs must be conducted only in designated locations.

(4) Trucks in need of repairs to the electrical system must have the battery disconnected prior to repair.

(5) Industrial truck parts must be replaced only by parts of equivalent safety.

(6) Industrial trucks must not be altered so that the relative positions of parts are different from when they were manufactured. Industrial trucks must not have parts added or eliminated, except as provided in WAC 296-306A-52005. Fork trucks must not have additional counterweighting added unless approved by the truck manufacturer.

(7) Industrial trucks must be examined at least daily before being placed in service. Industrial trucks must not be placed in service if the examination shows any unsafe condition.

Where industrial trucks are used on a round-the-clock basis, they shall be examined after each shift. Defects must be immediately reported and corrected.

(8) Water mufflers must be filled daily or as frequently as necessary to prevent the water supply from dropping below 75 percent. Vehicles must not be operated if muffler screens or other parts are clogged. Any vehicle that emits hazardous sparks or flames from the exhaust system must immediately be removed from service until the emission of such sparks and flames has been eliminated.

(9) When the temperature of any part of any truck exceeds its normal operating temperature, the vehicle must be removed from service until the cause for overheating has been eliminated.

(10) Industrial trucks must be kept clean and free of excess accumulations of combustible materials, oil, and grease. Noncombustible agents should be used for cleaning trucks. Low flash point (below 100°F) solvents must not be used. High flash point (at or above 100°F) solvents may be used. Take precautions regarding toxicity, ventilation, and fire hazard according to the agent or solvent used.

(11) Glycol base antifreeze must be used in the engine cooling system.

(12) Industrial trucks originally approved to use gasoline fuel may be converted to use LP-gas fuel if the converted truck has the features specified for LP or LPS designated trucks. The converted equipment must be approved. You may find a description of the conversion system and the recommended method of installation in the "listed by report" of a nationally recognized testing laboratory.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-52047, filed 10/31/96, effective 12/1/96.]

Part X
Rim Wheel Servicing

WAC 296-306A-530 Rim wheel servicing.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-530, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-53001 What does this section cover? WAC 296-306A-530 applies to the servicing of multipiece and single-piece rim wheels used on large vehicles such as trucks, tractors, trailers, buses and off-road machines. It does not apply to servicing rim wheels used on automobiles, or on pickup trucks and vans with automobile tires or truck tires designated "LT."

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-53001, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-53003 What definitions apply to rim wheel servicing? "Barrier" means a fence, wall, or structure placed between a single-piece rim wheel and an employee during tire inflation, to contain the rim wheel components in the event of the sudden release of the contained air of the single-piece rim wheel.

"Charts" means the United States Department of Labor, Occupational Safety and Health Administration (OSHA) publications entitled "Demounting and Mounting Procedures for Truck/Bus Tires" and "Multi-Piece Rim Matching Chart," the National Highway Traffic Safety Administration (NHTSA) publications entitled "Demounting and Mounting Procedures for Truck/Bus Tires" and "Multi-Piece Rim Matching Chart," or any other poster that contains at least the same instructions, safety precautions and other information contained in the charts that is applicable to the types of wheels being serviced.

"Installing a rim wheel" means the transfer and attachment of an assembled rim wheel onto a vehicle axle hub.

"Removing" means the opposite of installing.

"Mounting a tire" means the assembly or putting

together of the wheel and tire components to form a rim wheel, including inflation. "Demounting" means the opposite of mounting.

"Multipiece rim wheel" means the assembly of a multipiece wheel with the tire tube and other components.

"Multipiece wheel" means a vehicle wheel consisting of two or more parts, one of which is a side or locking ring designed to hold the tire on the wheel by interlocking components, when the tire is inflated.

"Restraining device" means a cage, rack, assembly of bars, or other components that will constrain all rim wheel components during an explosive separation of a multipiece rim wheel, or during the sudden release of the contained air of a single-piece rim wheel.

"Rim manual" means a publication containing instructions from the manufacturer or other qualified organization for correct mounting, demounting, maintenance, and safety precautions peculiar to the type of wheel being serviced.

"Rim wheel" means an assembly of tire, tube and liner (where appropriate), and wheel components.

"Service" or "servicing" means the mounting and demounting of rim wheels, and related activities such as inflating, deflating, installing, removing, and handling.

"Service area" means that part of an employer's premises used for the servicing of rim wheels, or any other place where an employee services rim wheels.

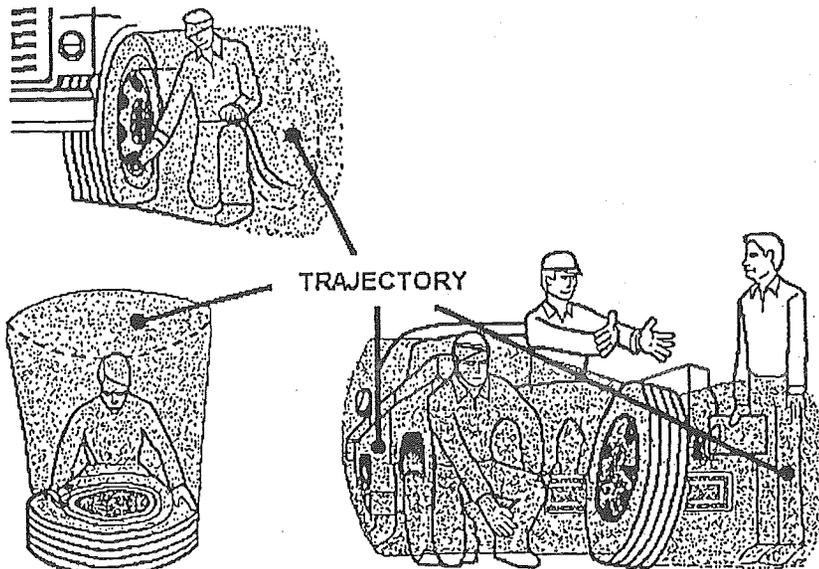
"Single-piece rim wheel" means the assembly of single-piece rim wheel with the tire and other components.

"Single-piece wheel" means a vehicle wheel consisting of one part, designed to hold the tire on the wheel when the tire is inflated.

"Trajectory" means:

- Any potential path that a rim wheel component may travel during an explosive separation, or the sudden release of the pressurized air; or
- An area at which an air blast from a single-piece rim wheel may be released.

The trajectory may deviate from paths that are perpendicular to the assembled position of the rim wheel. (See Figure for examples of trajectories.)



"Wheel" means the part of a rim wheel that provides the method of attachment of the assembly to the axle of a vehicle and also provides the means to contain the inflated portion of the assembly (i.e., the tire and/or tube).

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-53003, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-53005 What training must an employer provide for employees who service rim wheels?

(1) You must implement a training program that covers at least the following:

- (a) The hazards involved in servicing rim wheels;
- (b) The safe operating procedures for the types of wheel serviced, described in WAC 296-306A-53013 and 296-306A-53015; and
- (c) The applicable data contained in the charts (rim manuals) and the contents of this standard.

(2) You must ensure that each employee demonstrates and maintains the ability to service rim wheels safely, including the following:

- (a) Demounting tires (including deflation);
- (b) Inspecting and identifying the rim wheel components;
- (c) Mounting tires (including inflation with a restraining device or other safeguard required by this section);
- (d) Using the restraining device and other equipment required by this section;
- (e) Handling rim wheels;
- (f) Inflating the tire when a single-piece rim wheel is mounted on a vehicle;

(g) Understanding the necessity of standing outside the trajectory both during inflation of the tire and during inspection of the rim wheel following inflation; and

(h) Installing and removing rim wheels.

(3) If you believe that any employee is unable to read and understand the charts or rim manual, you must instruct the employee in the contents of the charts and rim manual in a manner that the employee can understand.

(4) You must evaluate each employee's ability to perform these tasks safely, and provide additional training as necessary to ensure that each employee maintains proficiency.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-53005, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-53007 What requirements apply to restraining devices? (1) You must furnish a restraining device for inflating tires on multipiece wheels.

(2) You must provide a restraining device for inflating tires on single-piece wheels unless the rim wheel will be bolted onto a vehicle during inflation.

(3) Restraining devices must:

(a) Withstand the force of a rim wheel separation occurring at 150% of the maximum tire pressure for the rim wheel being serviced.

(b) Prevent the rim wheel components from being thrown out of the device.

(c) The restraining device is visually inspected before each day's use and after any rim wheel separation or sudden release of contained air. Any damaged restraining device is immediately removed from service.

(d) If the restraining device is removed from service, it is not returned to service until repaired and reinspected. If the restraining device requires structural repair, it is not returned to service until certified by either the manufacturer or a registered professional engineer to meet the strength requirements of (a) of this subsection.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-53007, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-53009 What other equipment must an employer provide for rim wheel servicing? (1) You must furnish an air line assembly and ensure that employees use it for inflating tire.

(2) The air line assembly must contain the following components:

- (a) A clip-on chuck;
- (b) An in-line valve with a pressure gauge or a presettable regulator; and
- (c) Enough hose between the clip-on chuck and the in-line valve (if one is used) to allow the employee to stand outside the trajectory.

(3) Current charts or rim manuals for the types of wheels being serviced shall be available in the service area.

(4) You must furnish the tools recommended in the rim manual for the type of wheel being serviced and ensure that they are the only tools used to service rim wheels.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-53009, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-53011 What requirements apply to wheel component assembly? (1) You must ensure that multipiece wheel components are not interchanged except as provided in the charts or rim manual.

(2) Multipiece wheel components and single-piece wheels must be inspected prior to assembly. Any wheel or wheel component that is bent out of shape, pitted from corrosion, broken, or cracked shall not be used. Mark damaged wheels or components "unserviceable" and remove from the service area. Replace damaged or leaky valves.

(3) Rim flanges, rim gutters, rings, bead seating surfaces and the bead areas of tires must be free of any dirt, surface rust, scale or loose or flaked rubber build-up prior to mounting and inflation.

(4) The size (bead diameter and tire/wheel widths) and type of both the tire and the wheel must be checked for compatibility before assembly.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-53011, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-53013 What are the safe operating procedures for servicing multipiece rim wheels? You must establish safe operating procedures for servicing multipiece rim wheels, and ensure that employees are instructed in and follow the procedures. Your procedures must include at least the following:

(1) Before demounting, remove the valve core to completely deflate the tire.

(2) Remove the valve core to completely deflate the tire before removing a rim wheel from the axle whenever:

(a) The tire has been driven on underinflated at eighty percent or less of its recommended pressure; or

(b) There is obvious or suspected damage to the tire or wheel components.

(3) Apply rubber lubricant to bead and rim mating surfaces during wheel assembly and tire inflation, unless the tire or wheel manufacturer recommends against it.

(4) A tire on a vehicle underinflated at more than eighty percent of the recommended pressure may be inflated while the rim wheel is on the vehicle, only if remote control inflation equipment is used and no employees remain in the trajectory during inflation.

(5) Tires may be inflated outside a restraining device only to pressure sufficient to force the tire bead onto the rim ledge and to create an airtight seal with the tire and bead.

(6) Whenever a rim wheel is in a restraining device, the employee must not rest any part of the body or equipment on the restraining device.

(7) After tire inflation, inspect the tire and wheel components while still within the restraining device. Ensure that they are properly seated and locked. If further adjustment to the tire or wheel components is necessary, deflate the tire by removing the valve core before making adjustments.

(8) Never correct the seating of side and lock rings by hammering, striking, or forcing the components while the tire is pressurized.

(9) Cracked, broken, bent, or otherwise damaged rim components shall not be reworked, welded, brazed, or otherwise heated.

(10) When handling multipiece rim wheels, employees must stay out of the trajectory unless the performance of the servicing makes the employee's presence in the trajectory necessary.

(11) Do not apply heat to a multipiece wheel or wheel component.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-53013, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-53015 What are the safe operating procedures for servicing single-piece rim wheels? You must establish safe operating procedures for servicing single-piece rim wheels, and ensure that employees are instructed in and follow the procedures. Your procedures must include at least the following:

(1) Before demounting, remove the valve core to completely deflate the tire.

(2) Mount and demount tires only from the narrow ledge side of the wheel. Take care to avoid damaging the tire beads while mounting. Only mount tires on compatible wheels of matching bead diameter and width.

(3) Apply nonflammable rubber lubricant to bead and wheel mating surfaces before rim wheel assembly, unless the tire or wheel manufacturer recommends against it.

(4) When using a tire changing machine, inflate tires only to the minimum pressure necessary to force the tire bead onto the rim ledge while on the tire changing machine.

(5) When using a bead expander, remove the bead expander before the valve core is installed and as soon as the rim wheel becomes airtight (the tire bead slips onto the bead seat).

(6) Always inflate tires within a restraining device, positioned behind a barrier, or bolted on the vehicle with the lug nuts fully tightened.

(7) Inflate tires only when the trajectory area is clear of flat, solid objects.

(8) Employees stay out of the trajectory when inflating a tire.

(9) Tires must not be inflated to more than the inflation pressure stamped in the sidewall unless a higher pressure is recommended by the manufacturer.

(10) Tires must not be inflated above the maximum pressure recommended by the manufacturer to seat the tire bead firmly against the rim flange.

(11) Heat must not be applied to a single-piece wheel.

(12) Cracked, broken, bent, or otherwise damaged wheels must not be reworked, welded, brazed, or otherwise heated.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-53015, filed 10/31/96, effective 12/1/96.]

WAC 296-306A-53017 How can an employer order the OSHA charts? OSHA charts are available through OSHA area offices. You may find the address and telephone number of the nearest OSHA office in the local telephone directory under U.S. Government, U.S. Department of Labor, Occupational Safety and Health Administration. Single copies are available without charge.

If you want multiple copies of these charts, you may order them from the Publications Office, U.S. Department of Labor, Room N3101, Washington, D.C. 20210. Telephone: (202) 523-9667.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 96-22-048, § 296-306A-53017, filed 10/31/96, effective 12/1/96.]

Chapter 296-310 WAC

FARM LABOR CONTRACTING RULES

WAC

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296-310-270 Inspection of records.

WAC 296-310-010 Definitions. For the purposes of this chapter:

(1) "Agricultural employee" means any person who renders personal services to, or under the direction of, an agricultural employer in connection with the employer's agricultural activity.

(2) "Agricultural employer" means any person engaged in agricultural activity, including the growing, producing, or harvesting of farm or nursery products, or engaged in the forestation or reforestation of lands, which includes but is not limited to the planting, transplanting, tubing, precommercial thinning, and thinning of trees and seedlings, the clearing, piling, and disposal of brush and slash, the harvest of Christmas trees, and other related activities.

(3) "Bonded contractor" means a contractor who obtained a surety bond in order to comply with RCW 19.30.030(5).

(4) "Contractor" means a farm labor contractor.

(5) "Department" means the department of labor and industries.

(6) "Director" means the director of the department of labor and industries.

(7) "Employee" means an agricultural employee.

(8) "Farm labor contractor" means any person, or his or her agent or subcontractor, who, for a fee, performs any farm labor contracting activity.

(9) "License" means a farm labor contractor license.

(10) "Secured contractor" means a contractor who assigned a savings account to, or deposited cash or other security with, the department in order to comply with RCW 19.30.030(5).

(11) "Security" means a savings account assigned to, or cash or other security deposited with, the department.

[Statutory Authority: RCW 19.30.130. 86-01-027 (Order 85-34), § 296-310-010, filed 12/11/85.]

WAC 296-310-020 Application for initial and renewed licenses. (1) To obtain a license, a contractor must:

(a) Complete an application for a license;

(b) Provide the information required by RCW 19.30.030 (1), (6), and (7);

(c) Obtain a surety bond or provide other acceptable security to the department. If the contractor obtains a bond, it must submit the original bond to the department;

(d) Obtain insurance and supply the information required by WAC 296-310-040(2) if the contractor seeks a license to transport workers; and

(e) Pay the fee set by WAC 296-310-060.

(2) The department shall send a renewal notice to the contractor's last recorded address at least forty-five days before the contractor's license expires. The contractor may renew its license if it submits the renewal notice and provides the materials required in subsection (1)(b), (c), (d) if appropriate, and (e) of this section.

(3) The contractor must submit all materials to the department in one package. Each of the materials must name the contractor exactly as it is named on the application for license or the renewal notice. If the contractor is

renewing its license, each of the materials must include the contractor's license number. If any of the materials are missing, do not properly name the contractor, or do not include the license number, the department shall refuse to license or renew the license of the contractor.

(4) The bond and the insurance policy must expire no sooner than the expiration date of the license for which the contractor has applied.

(5) Applications for issuance or renewal of a license must be sent to:

Department of Labor and Industries
ESAC Division
General Administration Building
Olympia WA 98504

[Statutory Authority: RCW 19.30.130. 86-01-027 (Order 85-34), § 296-310-020, filed 12/11/85.]

WAC 296-310-030 Denial of license. (1) The department may refuse to issue or renew a license for the reasons listed in RCW 19.30.050 and 19.30.060. If the department refuses a license for any of these reasons, it shall serve on the contractor a notice of denial of license. The notice of denial of license shall:

(a) Describe concisely the ground for denial of the license; and

(b) Specify the statutory authority for the denial.

The notice of denial shall inform the contractor that it may request a hearing pursuant to WAC 296-310-160 on the denial. The notice shall specify that if no hearing is requested within thirty days of the date of issuance of the notice the director shall issue a final, unappealable order denying the license.

(2) The department also shall refuse to issue a license to or renew the license of a contractor who fails to comply with WAC 296-310-020. The department shall inform the contractor of the problem either in writing or, if appropriate, orally. Because compliance with WAC 296-310-020 involves technical requirements that are entirely within the control of the contractor, no hearing shall be granted on a failure to comply.

[Statutory Authority: RCW 19.30.130. 86-01-027 (Order 85-34), § 296-310-030, filed 12/11/85.]

WAC 296-310-040 Requirements for a license to transport employees. (1) A contractor who intends to transport employees must obtain liability insurance. The department shall require public liability and property damage insurance that provides coverage, for each single occurrence and for each vehicle used to transport employees, in the following minimum amounts:

(a) \$50,000 for injury or damage to property;

(b) \$100,000 for injury or damage, including death, to any one person; and

(c) \$500,000 for injury or damage, including death, to more than one person.

(2) The contractor must also provide to the department evidence of the insurance policy or policies.

[Statutory Authority: RCW 19.30.130. 86-01-027 (Order 85-34), § 296-310-040, filed 12/11/85.]

WAC 296-310-050 Amount of bond or security. (1)

A contractor must provide a bond or security in the following minimum amount:

- (a) If the contractor employs or intends to employ:
- (i) From one to ten employees: \$ 5,000
 - (ii) From eleven to fifty employees: \$10,000
 - (iii) From fifty-one to one hundred employees: \$15,000
 - (iv) Over one hundred employees: \$20,000

(b) If the contractor does not employ agricultural employees, but only recruits, solicits, supplies, transports, or hires employees for another person, and that person takes complete responsibility for payment of wages to the employees, the contractor shall obtain a \$5,000 bond or other security.

(2) If the contractor obtains a two-year license, the bond or security shall be twice the minimum amounts stated in subsection (1) of this section.

(3) The department may order the contractor to obtain a bond or security for an amount greater than the minimums set by subsections (1) and (2) of this section if the security or bond is insufficient to satisfy the contractor's potential liability for the license period. If the department determines that an increased bond is necessary, it shall serve on the contractor a notice to increase bond or security. The notice shall:

(a) Describe concisely the reasons an increase in the bond or security is necessary;

(b) Specify the statutory authority for the required increase; and

(c) Grant the contractor thirty days from the date of issuance of the notice to obtain and provide to the department the increased bond or security.

The notice shall inform the contractor that it may request a hearing pursuant to WAC 296-310-160 on the order to increase the bond or security. The notice shall specify that if no hearing is requested within thirty days of the date of issuance of the notice the director shall issue a final, unappealable order requiring the contractor to submit the increased bond or security. The notice shall also specify that, if the contractor neither appeals nor obtains the increased bond or security within the thirty days, the department shall suspend the contractor's license.

(4) If the director issues a final, unappealed decision raising the amount of the bond or security, the raised amount shall be required for all license periods after the date of issuance of the final decision unless the decision specifically states otherwise. A contractor may, if the circumstances that led to the increased amount change, file with the department a written petition to lower the amount. The petition shall specify the grounds that justify a lowering of the bond or security. The department shall investigate the petition and shall issue a new notice stating its decision on the bond amount. The contractor, if aggrieved, may appeal this new notice as provided in subsection (3) of this section.

[Statutory Authority: RCW 19.30.130. 86-01-027 (Order 85-34), § 296-310-050, filed 12/11/85.]

WAC 296-310-060 Fees. (1) The fee for a one-year license is:

- (a) For a contractor engaged in forestation or reforestation: \$100.00
- (b) For all other contractors: \$ 35.00
- (2) The fee for a two year license is:
 - (a) For a contractor engaged in forestation or reforestation: \$200.00
 - (b) For all other contractors: \$ 70.00

[Statutory Authority: RCW 19.30.130. 86-01-027 (Order 85-34), § 296-310-060, filed 12/11/85.]

WAC 296-310-070 Duplicate licenses. If a contractor loses its license, or if the license is stolen or destroyed, the contractor may obtain a duplicate license upon application to the department. The application must specify the reason a duplicate is necessary.

The duplicate license shall be stamped prominently with the word "duplicate." A new contractor license number shall be supplied to the contractor.

[Statutory Authority: RCW 19.30.130. 86-01-027 (Order 85-34), § 296-310-070, filed 12/11/85.]

WAC 296-310-080 Length of license period. A contractor who is obtaining its initial license shall be licensed for one year only. A contractor who is renewing its license may choose to obtain either a one-year or two-year license, unless the department informs the contractor that it may obtain only a one-year license.

All one-year licenses shall expire on December 31 of the year of issuance. All two-year licenses shall expire on December 31 of the year following the year of issuance.

[Statutory Authority: RCW 19.30.130. 86-01-027 (Order 85-34), § 296-310-080, filed 12/11/85.]

WAC 296-310-090 Change in business structure, name, address, or number of employees. (1) If a contractor changes its business structure (for example, if it changes from a partnership to a corporation, or if the partners in a partnership change), the contractor must apply for a new license in the manner required by WAC 296-310-020. If a contractor does not obtain a new license after a change in its business structure, its previous license may be invalid.

(2) If a contractor changes its name or address, it must notify the department within ten days.

(3) If a contractor begins employing agricultural employees, or increases the number of its employees, so that the bond or security is insufficient for that number of employees, the contractor must obtain a new bond or security in the amount required by WAC 296-310-050 and submit it to the department. The department need not issue a notice to increase the amount of bond or security in this situation.

[Statutory Authority: RCW 19.30.130. 86-01-027 (Order 85-34), § 296-310-090, filed 12/11/85.]

WAC 296-310-100 Cancellation of insurance or bond. (1) No surety company may cancel any bond issued to a contractor pursuant to RCW 19.30.040, unless the contractor previously submits another bond or other security, for the same amount, that covers the contractor's liability for the same period as that for the bond that is to be cancelled.

(2) A cancellation of a surety bond or insurance policy is effective thirty days after the department receives the cancellation notice, if the cancellation notice contains the following information:

- (a) The name of the contractor, exactly as it appears on the contractor's license;
- (b) The contractor's license number;
- (c) The contractor's business address;
- (d) The number of the bond or insurance policy that is to be cancelled;
- (e) The effective date of the bond or insurance policy that is to be cancelled; and
- (f) If the cancellation is of a surety bond, a certification that the contractor has previously obtained and submitted to the department a new bond or other security as required by subsection (1) of this section.

(3) To help the department process cancellations, the information in subsection (2) of this section should be provided in the order shown.

(4) The insurance and bonding companies should send cancellation notices to the department by certified or registered mail.

[Statutory Authority: RCW 19.30.130. 86-01-027 (Order 85-34), § 296-310-100, filed 12/11/85.]

WAC 296-310-110 Refund of security deposited with the department. (1) If a contractor is secured, the department shall release its interest in the security three years after the contractor's last license expired. The department shall not release its interest, however, if an unsatisfied judgment or claim is outstanding against the contractor.

(2) The department shall in any case release its interest in the security if the contractor provides a surety bond in the same amount that covers all of the periods in which the contractor was licensed for the previous three years, plus for the contractor's current license period if applicable.

[Statutory Authority: RCW 19.30.130. 86-01-027 (Order 85-34), § 296-310-110, filed 12/11/85.]

WAC 296-310-120 Revocation or suspension of license. (1) The department may revoke a contractor's license for the reasons listed in RCW 19.30.050(1) and 19.30.060. If the department revokes a license, it shall serve on the contractor a notice of revocation. The notice of revocation shall:

- (a) Describe concisely the ground for the revocation; and
- (b) Specify the statutory authority for the revocation.

The notice of revocation shall inform the contractor that it may request a hearing on the revocation. The notice shall specify that if no hearing is requested within thirty days after the date of issuance of the notice, the director shall issue a final, unappealable order revoking the contractor's license. The hearing may be requested pursuant to WAC 296-310-160.

(2) A contractor is entitled to retain its license only if it remains in compliance with the bonding and insurance requirements of RCW 19.30.030 and 19.30.040. If a contractor's surety bond or other security is impaired or becomes insufficient, the contractor's insurance policy is cancelled, or the contractor transports employees without

insurance, the department shall suspend the contractor's license until the contractor obtains a new bond, other security, or insurance policy, eliminates the impairment to the bond or security, or ceases to transport workers. The contractor may not do business while its license is suspended.

The department shall inform the contractor in writing of the suspension and of the steps the contractor must take to remove the suspension. The contractor may not appeal a suspension of licensing.

[Statutory Authority: RCW 19.30.130. 86-01-027 (Order 85-34), § 296-310-120, filed 12/11/85.]

WAC 296-310-130 Submission of complaint. Any person may submit to the department a complaint alleging a violation of chapter 19.30 RCW or challenging an application for a license. The complaint must describe the alleged violation or ground for denying a license, and must identify the alleged violator or applicant. It would aid the department's investigation if the complaint also specifies:

- (1) The name and address of the complainant; and
- (2) The address of the alleged violator or applicant.

[Statutory Authority: RCW 19.30.130. 86-01-027 (Order 85-34), § 296-310-130, filed 12/11/85.]

WAC 296-310-140 Investigation of complaint. The department shall investigate a complaint unless the complaint was submitted more than three years after the date of the alleged violation. The department shall not investigate any complaint filed more than three years after the date of the violation.

[Statutory Authority: RCW 19.30.130. 86-01-027 (Order 85-34), § 296-310-140, filed 12/11/85.]

WAC 296-310-150 Notice of violation. (1) If the department determines that there is reasonable cause to believe that chapter 19.30 RCW has been violated, the department shall serve on the violator a notice of violation. The notice of violation shall:

- (a) Describe concisely the violation;
- (b) Specify which statute was violated;
- (c) If known, identify the employees who were affected by the violation;
- (d) If known and applicable, state the amount of unpaid wages or damages the violator owes;
- (e) State the penalty, if any, the department will assess for the violation; and
- (f) State whether the contractor's license is being revoked as a result of the violation.

(2) If the notice alleges that the contractor owes unpaid wages or damages, the department shall serve a copy of the notice of violation on the violator's surety bond company.

(3) The notice of violation shall inform the violator and, if applicable, its surety that they may request a hearing on the violation, the amount of unpaid wages or damages owed, or the penalty assessed. The notice shall specify that if no hearing is requested within thirty days after the date the notice was issued the director shall issue a final, unappealable order finding that the violation did occur, ordering the violator to pay any unpaid wages or damages, and assessing penalties.

[Statutory Authority: RCW 19.30.130. 86-01-027 (Order 85-34), § 296-310-150, filed 12/11/85.]

WAC 296-310-160 Appeal of notices. (1) The contractor or violator, or the violator's surety if the surety has an interest in the matter, may request a hearing on the matter asserted in a notice of denial of license, a notice of revocation, a notice of increased bond amount, or a notice of violation. One original and four copies of the request must be filed with the director within thirty days after the date the department issued the notice. A party requesting a hearing on a notice of violation must also serve a copy of the request on the surety or the violator as appropriate.

(2) The request for hearing must be in writing and must specify:

(a) The name and address of the party requesting the hearing;

(b) The name and date of issuance of the notice that is being appealed;

(c) The matters contained in the notice that the requestor believes are erroneous;

(d) The reasons the notice is erroneous; and

(e) If a surety is appealing a notice of violation, the name and address of the violating contractor.

[Statutory Authority: RCW 19.30.130. 86-01-027 (Order 85-34), § 296-310-160, filed 12/11/85.]

WAC 296-310-170 Hearing on appeal of notice. (1) The director may hear an appeal personally or may delegate the authority to hold the hearing and draft a proposed decision to an administrative law judge pursuant to chapter 34.12 RCW. The plaintiff at the hearing shall be the department and the defendants shall be the contractor or the violator and its surety. The department shall have the burden of proving, by a preponderance of the evidence, that the matters stated in the notice occurred.

(2) Any person who has standing may, upon motion, be allowed to intervene as a plaintiff in a hearing on a notice of violation. Any interested person, whether or not admitted as a plaintiff, may submit written arguments and affidavits in any hearing.

(3) The hearing shall be conducted in accordance with the uniform procedure rules, chapter 1-08 WAC.

(4) If the director presides over the hearing, the director shall issue a final decision that includes findings of fact and conclusions of law and, if appropriate for a violation, an order to pay unpaid wages, damages, or a penalty.

(5) If an administrative law judge presides over the hearing, she or he shall issue a proposed decision that includes findings of fact and conclusions of law and, if appropriate for a violation, an order to pay unpaid wages, damages, or a penalty. The proposed decision shall be served on the contractor or the violator and its surety, the department, and any persons who have intervened as plaintiffs. Any of these parties, if aggrieved by the proposed decision, may appeal to the director within thirty days after the date of issuance of the proposed decision. If none of the parties appeals within thirty days, the proposed decision may not be appealed either to the director or the courts. A copy of the proposed decision shall also be mailed to all persons who submitted written arguments or affidavits at the hearing.

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(6) An appellant must file with the director an original and four copies of its notice of appeal. The notice of appeal must specify which findings and conclusions are erroneous. The appellant must attach to the notice the written arguments supporting its appeal.

The appellant must serve a copy of the notice of appeal and the arguments on the other parties. The respondent parties must file with the director their written arguments within thirty days after the date the notice of appeal and the arguments were served upon them.

(7) The director shall review the proposed decision in accordance with the Administrative Procedure Act, chapter 34.04 RCW. The director may: Require the parties to specify the portions of the record on which the parties rely; require the parties to submit additional information by affidavit or certificate; remand the matter to the administrative law judge for further proceedings; and require a department employee to prepare a summary of the record for the department to review. The director may allow the parties to present oral arguments as well as the written arguments. The director shall issue a final decision that can affirm, modify, or reverse the proposed decision.

(8) The director shall serve the final decision on all parties. Any aggrieved party may appeal the final decision to superior court pursuant to RCW 34.04.130 unless the final decision affirms an unappealed proposed decision. If no party appeals within the period set by RCW 34.04.130, the director's decision is conclusive and binding on all parties. The director shall also mail a copy of the final decision to all persons who submitted written arguments or affidavits at the hearing.

[Statutory Authority: RCW 19.30.130. 86-01-027 (Order 85-34), § 296-310-170, filed 12/11/85.]

WAC 296-310-180 Effect of final decision. If the director issues a final decision that includes a finding that a violator owes unpaid wages or damages, and the finding is not appealed or is affirmed by the courts, the finding and the decision are res judicata in any action by the department, or by any other person who was a plaintiff at the hearing, against the violator and its surety to recover the unpaid wages or damages. The finding and decision are not res judicata in any action by a person who was not a party at the hearing.

[Statutory Authority: RCW 19.30.130. 86-01-027 (Order 85-34), § 296-310-180, filed 12/11/85.]

WAC 296-310-190 Suit by department for unpaid wages or damages. (1) RCW 19.30.160(4) authorizes the department to sue a violator and its surety on behalf of an employee to recover unpaid wages and other damages. The department is not required to bring suit and, in its sole discretion, may decide not to do so in any case. The department also shall not sue on behalf of any employee who has already brought a suit against the violator and its surety in the matter.

(2) The department may file a suit against the violator and its surety at any time and without regard to whether administrative proceedings have been exhausted.

(3) The department may include in any suit a request for an injunction against the violator.

[Statutory Authority: RCW 19.30.130. 86-01-027 (Order 85-34), § 296-310-190, filed 12/11/85.]

WAC 296-310-200 Procedures for filing suit against a contractor. (1) A suit against a contractor and its bond or security for unpaid wages or damages may be brought in any court with jurisdiction. The venue may be in the county in which the claim arose, or in which either the damaged person or the defendant resides.

(2) When a contractor is sued, the plaintiff must serve the summons and complaint on the contractor and its surety by serving three copies of the summons and complaint by certified or registered mail on the department. The department shall not accept personal service of the summons and complaint.

(3) The department may be unable to process a summons and complaint if the summons and complaint do not contain the following information:

(a) The contractor's name exactly as it appears on the contractor's license;

(b) The contractor's business address;

(c) The names of the owners, partners, or officers of the contractor; and

(d) The contractor's license number.

If the suit names a surety as a defendant, the summons and complaint should also include:

(e) The name and address of the surety that issued the contractor's bond;

(f) The bond number; and

(g) The effective date of the bond.

If the information is insufficient for the department to identify the contractor or surety that is being sued, the department shall not attempt to serve the summons and complaint and shall return them to the plaintiff.

[Statutory Authority: RCW 19.30.130. 86-01-027 (Order 85-34), § 296-310-200, filed 12/11/85.]

WAC 296-310-210 Collection of judgments. (1) If a contractor is secured, a plaintiff who has received a final judgment against a contractor may satisfy the judgment out of the security held by the department.

(2) The department shall satisfy a final judgment if the plaintiff serves on the department three certified copies of the unsatisfied judgment. The plaintiff must include the following information with the copies of the judgment:

(a) The name of the contractor, exactly as it appears on the contractor's license;

(b) The contractor's business address;

(c) The names of the owners, partners, or officers of the contractor;

(d) The contractor's license number; and

(e) The exact amount of the judgment awarded by the court, including attorney's fees and interest.

If the department does not receive sufficient information to enable it to pay the judgment, it shall inform the plaintiff that more information is needed.

(3) If a contractor is bonded, a plaintiff can satisfy a final judgment only against the contractor or the bonding company. The department can neither satisfy the judgment nor, unless the department itself is the plaintiff, force the contractor or the bonding company to pay the judgment.

The plaintiff must join the bonding company in the suit if it wants the bonding company to pay the judgment.

[Statutory Authority: RCW 19.30.130. 86-01-027 (Order 85-34), § 296-310-210, filed 12/11/85.]

WAC 296-310-220 Priority for payment of judgments. RCW 19.30.170 contains two different provisions for priority in paying judgments from the contractor's bond or security.

(1) If a contractor is secured, the department shall satisfy final judgments against the contractor in the order the department receives the judgments.

(2) If a contractor is bonded, claims for unpaid wages and benefits are satisfied first, claims for damages are satisfied second, and claims for costs and attorney's fees are satisfied last. No claim in a lesser category may be satisfied until all pending claims in the preceding categories are satisfied, unless the total amount of all pending claims in the preceding categories is less than the amount of the bond that remains unimpaired.

[Statutory Authority: RCW 19.30.130. 86-01-027 (Order 85-34), § 296-310-220, filed 12/11/85.]

WAC 296-310-230 Civil penalties. (1) In determining the amount of any civil penalty to be imposed under RCW 19.30.160 the department shall consider the following factors:

(a) Previous violations by the violator;

(b) The history of the violator in taking all necessary measures to prevent or correct violations;

(c) The magnitude and seriousness of the violation;

(d) The remedial purpose of chapter 19.30 RCW;

(e) Any mitigating circumstances; and

(f) Any other factors the department considers relevant.

(2) It is the violator's responsibility to inform the department of mitigating evidence.

(3) The penalties for acting as a contractor without a license, or for transporting employees without an endorsement to do so, are:

(a) Up to \$500 for the first violation;

(b) Up to \$750 for the second violation; and

(c) Up to \$1000 for the third and any further violations.

[Statutory Authority: RCW 19.30.130. 86-01-027 (Order 85-34), § 296-310-230, filed 12/11/85.]

WAC 296-310-240 Adjustment of controversies. (1) Upon receipt of a complaint or on its own motion, the department shall attempt to adjust equitably a controversy between a contractor and its employees.

(2) No particular form of proceeding is necessary for resolving disputes. The supervisor of employment standards shall, in each case, use his or her best judgment in designing a procedure. However, in every case in which the supervisor determines that a hearing should be held, the supervisor shall notify the affected persons, or their representatives, of the time, date, place, and purpose of the hearing.

(3) A hearing shall be informal and shall not be subject to chapter 34.04 RCW. The supervisor's suggestions for resolution are advisory and not binding, and may not be appealed to any person or court.

(4) The director may delegate the resolution of any particular case to a person other than the supervisor of employment standards. That person shall have the same authority as the supervisor to determine the form of the proceeding.

[Statutory Authority: RCW 19.30.130, 86-01-027 (Order 85-34), § 296-310-240, filed 12/11/85.]

WAC 296-310-250 Filing and service. All papers required to be filed with the director under this chapter or chapter 19.30 RCW shall be addressed to Director, Department of Labor and Industries, General Administration Building, Olympia, WA 98504.

Filing and service may be made as provided in WAC 1-08-090 through 1-08-140.

[Statutory Authority: RCW 19.30.130, 86-01-027 (Order 85-34), § 296-310-250, filed 12/11/85.]

WAC 296-310-260 Liability of person who uses services of unlicensed contractor. (1) A person who knowingly uses the services of an unlicensed contractor is liable for unpaid wages, damages, and civil and criminal penalties to the same extent as the unlicensed contractor.

(2) Pursuant to RCW 19.30.200, a person may prove lack of knowledge by proving that she or he relied on a license issued by the department under chapter 19.30 RCW, or upon the department's representation that the contractor was licensed. The department shall not make oral representations that a contractor is or is not licensed. All representations by the department that a contractor is licensed shall be made in writing and shall be signed by the director or the employment standards supervisor or the assistant director. The department shall not accept reliance on a supposed oral representation as proof in any administrative enforcement proceeding.

[Statutory Authority: RCW 19.30.130, 86-01-027 (Order 85-34), § 296-310-260, filed 12/11/85.]

WAC 296-310-270 Inspection of records. A contractor or any person using a contractor's services shall allow a representative of the department to inspect at any reasonable time the records it is required to keep by chapter 19.30 RCW.

[Statutory Authority: RCW 19.30.130, 86-01-027 (Order 85-34), § 296-310-270, filed 12/11/85.]

Chapter 296-350 WAC

REASSUMPTION OF JURISDICTION PURSUANT TO RCW 49.17.140

WAC

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DISPOSITION OF SECTIONS FORMERLY CODIFIED IN THIS CHAPTER

296-350-300 Repeat violations. [Statutory Authority: RCW 49.17.040 and 49.17.050, 86-06-002 (Order 86-17), § 296-350-300, filed 2/20/86.] Repealed by 91-24-017 (Order 91-07), filed 11/22/91, effective 12/24/91. Statutory Authority: Chapter 49.17 RCW.

WAC 296-350-010 Definitions. (1) The definitions and interpretations of RCW 49.17.020 shall apply to the provisions of this chapter unless the context of the provision clearly requires otherwise.

(2) "Presiding officer" means that person designated by the director as being responsible for the conducting of the informal conference provided for in RCW 49.17.140(3) and WAC 296-350-070.

(3) "Act" means the Washington Industrial Safety and Health Act (chapter 80, Laws of 1973; chapter 49.17 RCW) as now or hereafter amended.

(4) "Assistant director" shall mean the assistant director of consultation and compliance of the department, or his/her designated representative.

(5) "Citation" shall mean that CITATION issued to an employer in accordance with the provisions of RCW

49.17.120, otherwise known as a CITATION AND NOTICE. (Form No. WISHERS-110.)

(6) "Abatement date" shall mean the date identified as such on the CITATION. The "abatement date" is the date by which the condition identified in the CITATION must be brought into compliance with the cited safety and health standard.

(7) "Division" shall mean the division of consultation and compliance of the department.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-350-010, filed 7/20/94, effective 9/20/94. Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 42.30 and 43.22 RCW. 80-17-014 (Order 80-20), § 296-350-010, filed 11/13/80; Order 75-14, § 296-350-010, filed 4/14/75; Order 74-21, § 296-350-010, filed 5/6/74.]

WAC 296-350-020 Reassumption of jurisdiction—Purpose. The purpose of the department's reassuming jurisdiction over all or any part of the subject matter of a notice of appeal, as authorized by RCW 49.17.140(3), is to afford an opportunity for those parties authorized to file such a notice of appeal to present relevant and material facts, opinions and other relevant and material information, material or data to the department in support of or in opposition to the subject matter of the appeal.

[Order 75-14, § 296-350-020, filed 4/14/75; Order 74-21, § 296-350-020, filed 5/6/74.]

WAC 296-350-030 Notice of appeal—Filing and service. Any party authorized to appeal from an action of the department as set forth in RCW 49.17.140(3), may do so by filing a notice of appeal in writing in the recommended manner and containing the recommended subject matter as hereinafter set forth with fifteen working days of the communication of the notice, by serving a copy of such notice of appeal either in person or by mail upon the assistant director of the Division of Consultation and Compliance, P.O. Box 44600, Olympia, Washington 98504-4600.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-350-030, filed 7/20/94, effective 9/20/94; 90-09-026 (Order 90-01), § 296-350-030, filed 4/10/90, effective 5/25/90. Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 42.30 and 43.22 RCW. 80-17-014 (Order 80-20), § 296-350-030, filed 11/13/80; Order 75-14, § 296-350-030, filed 4/14/75; Order 74-21, § 296-350-030, filed 5/6/74.]

WAC 296-350-040 Notice of appeal—Contents. In order to expedite the decision of the department as to whether to reassume jurisdiction over the subject matter of the appeal and in order to facilitate the certification of the notice of appeal and department file to the board of industrial insurance appeals, if appropriate, the notice of appeal should contain:

(1) The name and address of the appealing party and his/her representative, if any;

(2) The place where the alleged safety violation occurred;

(3) A statement identifying the order, decision or citation appealed from by report number and date of issuance.

(4) The grounds upon which the appealing party considers such order, decision or citation to be unjust or unlawful;

(5) A statement of facts in support of each grounds stated;

(6) The relief sought, including the specific nature and extent;

(7) A statement that the person signing the notice of appeal has read it and to the best of his/her knowledge, information and belief there is good ground to support it. A notice of appeal may be signed by the party or by his/her authorized representative.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-350-040, filed 7/20/94, effective 9/20/94; Order 75-14, § 296-350-040, filed 4/14/75; Order 74-21, § 296-350-040, filed 5/6/74.]

WAC 296-350-050 Reassumption of jurisdiction—Time—Notice of reassumption of jurisdiction and informal conference. After receipt of a notice of appeal filed pursuant to RCW 49.17.140(3), and these rules, the department after investigation of the allegations contained in the notice of appeal, and not later than five working days from the date of receipt of such notice of appeal, shall make a determination to reassume jurisdiction over the subject matter of the appeal or, in the alternative, certify the record of the department which is the subject of appeal to the board of industrial insurance appeals along with such notice of appeal. If the department determines to reassume jurisdiction over the subject matter of the appeal, a **notice of reassumption of jurisdiction** and a **notice of informal conference** shall be issued giving notice that jurisdiction has been reassumed and that an opportunity will be afforded to all appealing parties as well as other interested parties as prescribed in RCW 49.17.140(3), to participate in an informal conference and that any redetermination and corrective notices will be completed not later than thirty working days (that may be extended an additional fifteen working days upon agreement of all parties to the appeal) following the date that the determination to reassume jurisdiction was made. The notice of informal conference shall give notice of the time, date and place at which such informal conference is to be conducted. The **notice of reassumption of jurisdiction and informal conference** may be combined on one document and issued as a single notice.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-350-050, filed 7/20/94, effective 9/20/94. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-16-008 (Order 86-27), § 296-350-050, filed 7/25/86; Order 76-6, § 296-350-050, filed 3/1/76; Order 75-14, § 296-350-350 (codified as WAC 296-350-050), filed 4/14/75; Order 74-21, § 296-350-050, filed 5/6/74.]

WAC 296-350-060 Notices of reassumption of jurisdiction and informal conferences—Service—Posting record. Either the original or copies of the notice of reassumption of jurisdiction and the notice of informal conferences shall be forwarded by certified mail to all parties, or their representatives, with a copy to the employer at the premises of the employer affected by the appeal which shall be posted by the employer in a place or places reasonably accessible to all affected employees. In addition to the written notice of informal conference and reassumption of jurisdiction, the department may give telephonic or telegraphic notice of the time, date and place for any informal conference. The notice of informal conference shall in all cases advise that all appealing parties, as well as affected

employees and representatives of affected employees, may either orally, or in writing, not later than the date fixed for such conference object to or support the subject matter of the reassumption of jurisdiction by the department. Informal conferences will ordinarily be held at the district office of the department most convenient to the appealing parties. The information presented by the participants at the informal conference and the arguments of the respective parties objecting to or supporting the subject matter of the reassumption of jurisdiction by the department shall be recorded either manually or by a mechanical device. Documentary or other types of physical materials presented at the informal conference shall be made a part of the record of the informal conference.

[Order 75-14, § 296-350-060, filed 4/14/75; Order 74-21, § 296-350-060, filed 5/6/74.]

WAC 296-350-070 Reassumption of jurisdiction—Informal conferences—Procedure—Evidence. (1) The director shall designate personnel of the staff of the division of consultation and compliance to act as presiding officers at informal conferences.

(2) A presiding officer shall be present and preside over the proceedings at all informal conferences conducted. He/she may be accompanied by an assistant attorney general who shall be able to render legal advice to the presiding officer. The assistant attorney general may, at the presiding officer's request, preside over the proceedings.

(3) Prior to the commencement of the informal conference, the presiding officer may confer with the parties to the informal conference concerning the material to be presented for the record in order to determine an orderly method of procedure. The designated presiding officer may admit and give probative effect to evidence which possesses probative value commonly accepted by reasonably prudent persons in the conduct of their affairs. Effect shall be given to the rules of privilege recognized by law. The presiding officer may exclude incompetent, irrelevant, immaterial and unduly repetitious evidence. Documentary evidence may be received in the form of copies of excerpts or by incorporation in the record by reference. Every party shall have the right to ask questions of other parties present. The designated presiding officer may take notice of judicially cognizable facts and in addition may take notice of general, technical, or scientific facts within the specialized knowledge of the department's officers relating to industrial safety and health.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-350-070, filed 7/20/94, effective 9/20/94; Order 75-14, § 296-350-070, filed 4/14/75; Order 74-21, § 296-350-070, filed 5/6/74.]

WAC 296-350-080 Reassumption of jurisdiction—Final determination—Mailing. (1) Immediately following the informal conference the presiding officer shall complete a status report of the reassumption of jurisdiction which shall include a summary of findings and conclusions and shall state therein the redetermination and final decision of the department. The presiding officer shall then complete and submit those documents which are necessary for the expeditious processing of these redeterminations and final decisions such that all corrective abatement, relating to the subject matter of the reassumption of jurisdiction, can be issued by

the department within thirty working days of the determination to reassume jurisdiction over the subject matter of the appeal.

(2) Corrective notices issued following reassumption of jurisdiction shall be forwarded by certified mail or personal delivery or service. Upon receipt of a corrective notice of redetermination issued by the department pursuant to RCW 49.17.140(3), the employer shall immediately post the corrective notice of redetermination or a copy thereof in a prominent place at or near each place a violation referred to in the corrective notice of redetermination occurred. The corrective notice of redetermination or a copy thereof shall remain posted as required by this section until the violation(s) have been abated, or for three working days, whichever is longer.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 86-16-008 (Order 86-27), § 296-350-080, filed 7/25/86; 82-13-045 (Order 82-22), § 296-350-080, filed 6/11/82; Order 76-6, § 296-350-080, filed 3/1/76; Order 75-14, § 296-350-080, filed 4/14/75; Order 74-21, § 296-350-080, filed 5/6/74.]

WAC 296-350-090 Reassumption of jurisdiction—Statement of redetermination—Appeal. All corrective notices of assessment of penalty, citations or revised periods of abatement shall include a statement identifying the notice as having been issued according to the provisions of RCW 49.17.140(3) and that any appeal thereto must be made to the board of industrial insurance appeals, with a copy of the notice of appeal to be served on the department, within fifteen working days of the communication of the corrective notice, or the same shall be deemed a final order of the department and not subject to review by any court or agency.

[Order 75-14, § 296-350-090, filed 4/14/75; Order 74-21, § 296-350-090, filed 5/6/74.]

WAC 296-350-095 Settlement agreements. (1) Every settlement agreement in an appeal to the board of industrial insurance appeals shall contain a statement of the abatement date for the cited condition or a statement that the condition has been abated. If any settlement agreement lacks a statement of abatement date, the department shall assign an abatement date to the condition which allows the same amount of time for abatement as was allowed by the original abatement date; the amount of time for abatement shall be figured from the date that the board of industrial insurance appeals issues its order adopting the settlement agreement.

(2) Every settlement agreement shall contain a statement that payment of any penalty has been tendered or a statement of a promise to pay any penalty.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 82-13-045 (Order 82-22), § 296-350-095, filed 6/11/82.]

WAC 296-350-200 Variances—Foreword. WAC 296-350-200 through 296-350-280 contain rules pursuant to which employers may apply for departmental orders granting variances from industrial safety and health standards in accordance with the provisions of RCW 49.17.080 and 49.17.090. Also included are rules on procedures to be followed by the director or his/her authorized representatives following the receipt of such an application for an order granting a variance.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-350-200, filed 7/20/94, effective 9/20/94; Order 75-14, § 296-350-200, filed 4/14/75.]

WAC 296-350-210 Types of orders granting a variance. (1) Section 8 (RCW 49.17.080) and section 9 (RCW 49.17.090) of the Washington Industrial Safety and Health Act (chapter 80, Laws of 1973) provide for the granting of two types of orders granting a variance from industrial safety and health standards administered according to that chapter.

(2) RCW 49.17.080 authorizes the issuance of an order granting a variance (temporary) from any safety and health standard promulgated under the authority of the act upon proper application by the employer and sufficient showing by the applicant employer that the applicant employer is unable to comply with a safety and health standard because of unavailability of professional or technical personnel or materials and equipment needed to come into compliance with the safety and health standard or because necessary construction or alteration of facilities cannot be accomplished by the effective date of the standard, and that the employer is taking all available steps to safeguard his/her employees against the hazards covered by the safety and health standard and that the employer has an effective program for coming into compliance with the safety and health standard as quickly as practicable.

(3) RCW 49.17.090 authorizes the issuance of an order granting a variance (permanent) from any safety and health standard promulgated under the authority of the act upon proper application by the employer and sufficient showing by the applicant employer that the conditions, practices, means, methods, operations or processes used or proposed to be used by such applicant employer will provide employment and places of employment to his/her employees which are as safe and healthful as those which would prevail if the employer complied with the safety and health standard or standards from which the variance is sought.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-350-210, filed 7/20/94, effective 9/20/94; Order 75-14, § 296-350-210, filed 4/14/75.]

WAC 296-350-230 Effect of variances. All variances granted pursuant to the provisions of this chapter shall have only future effect. In his/her discretion, the director or his/her authorized representative may decline to entertain an application for a variance on a subject or issue concerning which a citation has been issued to the employer involved and a proceeding on the citation or a related issue concerning a proposed penalty or period of abatement is pending before the board of industrial insurance appeals, or an appropriate court, until the completion of such proceeding.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-350-230, filed 7/20/94, effective 9/20/94; Order 75-14, § 296-350-230, filed 4/14/75.]

WAC 296-350-240 Variance applications—Form of documents—Subscription. (1) No particular form is prescribed for applications and other papers which may be filed in proceedings relating to the application for an order granting a variance. However, any applications and other papers shall be clearly legible. Department forms for

application for a variance may be used and may be obtained from the Division of Consultation and Compliance, Department of Labor and Industries, P.O. Box 44600 Olympia, Washington 98504-4600; or other offices of that division.

(2) Each application or other paper which is filed in proceedings relating to the application for an order granting a variance under this chapter shall be subscribed by the person filing the same or by his/her attorney or other authorized representative.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-350-240, filed 7/20/94, effective 9/20/94; Order 75-14, § 296-350-240, filed 4/14/75.]

WAC 296-350-250 Order granting a temporary variance—Application. (1) Application for a temporary variance. Any employer desiring a variance from a standard, or portion thereof, authorized by section 8 of the act (RCW 49.17.080) may file a written application containing the information specified in this section with the Assistant Director of the Division of Consultation and Compliance, P.O. Box 44600, Olympia, Washington 98504-4600.

(2) Contents. An application filed pursuant to subsection (1) of this section shall include:

(a) The name and address of the applicant;
 (b) The address of the place of employment involved;
 (c) A specification of the standard or portion thereof from which the applicant seeks a variance; to include a reference to the appropriate code section or sections;

(d) A representation by the applicant supported by representations from a qualified person or persons having firsthand knowledge of the facts represented, that he/she is unable to comply with the standard or portion thereof by its effective date and a detailed statement of the reasons therefor;

(e) A statement of the steps the applicant has taken and will take, with specific dates where appropriate, to protect employees against the hazard covered by the standard;

(f) A statement of when the applicant expects to be able to comply with the standard and of what steps he/she has taken and will take, with specific dates where appropriate, to come into compliance with the standard;

(g) A statement of the facts the applicant would show to establish that:

(i) The applicant is unable to comply with a standard by its effective date because of unavailability of professional or technical personnel or materials and equipment needed to come into compliance with the standard or because necessary construction or alteration of facilities cannot be completed by the effective date of the standard from which the variance is sought;

(ii) He/she is taking all available steps to safeguard their employees against the hazards covered by the standard; and
 (iii) He/she has an effective program for coming into compliance with the standard as quickly as practicable;

(h) Any request for a hearing, as provided in WAC 296-350-280;

(i) A statement that the applicant has informed their affected employees of the application by giving a copy thereof to their authorized representative, posting a statement, giving a summary of the application and specifying where a copy may be examined, at the place or places where

notices to employees are normally posted, and by other appropriate means; and

(j) A description of how affected employees have been informed of the application and of their right to petition the director for a hearing.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-350-250, filed 7/20/94, effective 9/20/94; Order 75-14, § 296-350-250, filed 4/14/75.]

WAC 296-350-255 Order granting a permanent variance—Application. (1) Application for a permanent variance. Any employer desiring a variance authorized by section 9 of the act (RCW 49.17.090) may file a written application containing the information specified in this section with the Assistant Director of Consultation and Compliance, P.O. Box 44600, Olympia, Washington 98504-4600.

(2) Contents. An application filed pursuant to subsection (1) of this section shall include:

(a) The name and address of the applicant;

(b) The address of the place of employment involved;

(c) A specification of the standard or portion thereof from which the applicant seeks a variance; to include a reference to the appropriate code section or sections;

(d) A description of the conditions, practices, means, methods, operations, or processes used or proposed to be used by the applicant;

(e) A statement showing how the conditions, practices, means, methods, operations, or processes used or proposed to be used would provide employment and places of employment to employees which are as safe and healthful as those required by the standard from which a variance is sought;

(f) A certification that the applicant has informed his/her employees of the application by:

(i) Giving a copy thereof to their authorized representative;

(ii) Posting a statement giving a summary of the application and specifying where a copy may be examined, at the place or places where notices to employees are normally posted (or in lieu of such summary, the posting of the application itself); and

(iii) By other appropriate means.

(g) Any request for a hearing, as provided in WAC 296-350-280; and

(h) A description of how employees have been informed of the application and of their right to petition the director for a hearing.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-350-255, filed 7/20/94, effective 9/20/94. Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 42.30 and 43.22 RCW. 80-17-014 (Order 80-20), § 296-350-255, filed 11/13/80; Order 75-14, § 296-350-255, filed 4/14/75.]

WAC 296-350-260 Interim order—Application—Notice of grant. (1) An application may also be made for an interim order to be effective until a decision is rendered on the application for the variance filed previously or concurrently. An application for an interim order may include statements of fact and arguments as to why the order should be granted. The director or his/her authorized representatives may rule *ex parte* upon the application.

(2) If an interim order is granted, a copy of the order shall be served upon the applicant for the order and other parties. It shall be a condition of the order that the employer shall give notice thereof to affected employees by the same means to be used to inform them of an application for a variance.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-350-260, filed 7/20/94, effective 9/20/94; Order 75-14, § 296-350-260, filed 4/14/75.]

WAC 296-350-270 Notice of denial of application for variance. If an application for a variance filed pursuant to this chapter is denied, the applicant shall be given prompt notice of the denial, which shall include, or be accompanied by a brief statement of the grounds therefor.

[Order 75-14, § 296-350-270, filed 4/14/75.]

WAC 296-350-280 Hearings on applications for variances—Temporary and permanent. (1) Any affected employee or employees, or an authorized representative of affected employees may request of the assistant director of consultation and compliance that a hearing be held on the application for a temporary or permanent variance.

(2) The employer applicant or his/her representative may request of the assistant director of consultation and compliance that a hearing be held on the application for a temporary or permanent variance.

(3) Requests for hearings authorized by section 8 and 9 of the act (RCW 49.17.080 and 49.17.090) and subsections (1) and (2) of this section shall be in writing, signed by the applicant, and must be received by the assistant director of consultation and compliance within twenty-one calendar days of the date of the application for a variance.

(4) After receipt of a request for a hearing filed pursuant to these rules, the department, not later than ten working days from the date of the receipt of such request, shall issue a notice of hearing advising that the opportunity will be afforded to all interested parties as prescribed in this section to participate in a hearing on the application for a variance. The notice of hearing shall fix the time for such hearing, such that the affected parties can reasonably be expected to receive the NOTICE OF HEARING not less than twenty days in advance of the date set for the hearing, and shall indicate the time, date and place at which such hearing is to be conducted. Such notice of hearing shall be immediately communicated to affected employees by giving a copy thereof to their authorized representative and posting a copy thereof with the application for a variance or a summary of said application as prescribed in WAC 296-350-250 (2)(i) or (2)(f). In addition to the forwarding of the notice of hearing, the department may give telephonic or telegraphic notice of the time, date and place for any such hearing.

(5) The director shall designate department personnel to act as presiding officers at hearings on applications for variances.

(6) The duties of the presiding officer include but are not limited to the following:

(a) A presiding officer shall be present and preside over the proceedings at all hearings conducted. He/she may be accompanied by an assistant attorney general who shall be able to render legal advice to the presiding officer. The

assistant attorney general may, at the presiding officer's request, preside over the proceedings.

(b) Prior to the commencement of the hearing, the presiding officer may confer with the parties attending the hearing concerning the material to be presented for the record in order to determine an orderly method of procedure. The designated presiding office may admit and give effect to evidence which possesses probative value commonly accepted by reasonably prudent people in the conduct of their affairs. Effect shall be given to the rules of privilege recognized by law. The presiding officer may exclude incompetent, irrelevant, immaterial and unduly repetitious evidence. Documentary evidence may be received in the form of copies of exhibits or by incorporation in the record by reference. Every party shall have the right to ask questions of other parties present. The designated presiding officer may take notice of judicially cognizable facts, and in addition may take notice of general, technical or scientific facts within the specialized knowledge of the department's officers relating to industrial safety and health.

(c) All proceedings relating to a hearing under this section shall be recorded mechanically or otherwise. Copies of transcripts of such recordings will be made available to any party at cost upon request of the party.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-350-280, filed 7/20/94, effective 9/20/94. Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 42.30 and 43.22 RCW. 80-17-014 (Order 80-20), § 296-350-280, filed 11/13/80; Order 75-14, § 296-350-280, filed 4/14/75.]

WAC 296-350-350 **Extension of abatement date(s)—Application—Authority.** All sections of this chapter which include WAC 296-350-350 in the section number apply to the request of extension of abatement dates in accordance with the provisions of RCW 49.17.140(3), which reads in pertinent part:

"Upon application by an employer showing that a good faith effort to comply with the abatement requirements of a citation has been made and that the abatement has not been completed because of factors beyond his/her control, the director after affording an opportunity for a hearing shall issue an order affirming or modifying the abatement requirements in such citation."

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-350-350, filed 7/20/94, effective 9/20/94; Order 75-14, § 296-350-350, filed 4/14/75.]

WAC 296-350-35010 **Application for extension of abatement date(s).** Applications for extensions of abatement dates shall be submitted in writing by the employer, or his/her representative, whose workplace is the subject of the citation containing the abatement date for which the extension(s) is (are) sought. Subject to the provisions of WAC 296-350-35015, applications received by telephone or personal nonwritten communication may be acted upon by the assistant director.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-350-35010, filed 7/20/94, effective 9/20/94. Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 42.30 and 43.22 RCW. 80-17-014 (Order 80-20), § 296-350-35010, filed 11/13/80; Order 76-29, § 296-350-35010, filed 9/30/76; Order 75-14, § 296-350-35010, filed 4/14/75.]

WAC 296-350-35015 **Extension of abatement date(s)—Application—Timeliness.** (1) An application for the extension of an abatement date, or abatement dates, shall be considered a timely application if it is served on the division at any time prior to midnight of the abatement date for which the extension is sought.

(2) A later-filed application may be acted upon by the division if it is received by the division within five days following the relevant abatement date(s) and is accompanied by the employer's written statement of exceptional circumstances explaining the delayed filing: *Provided*, That such later-filed application shall not be acted upon if the department has initiated compliance activity regarding the relevant abatement date(s) prior to the receipt of the later-filed application for extension.

[Order 76-29, § 296-350-35015, filed 9/30/76; Order 75-14, § 296-350-35015, filed 4/14/75.]

WAC 296-350-35020 **Extension of abatement date(s)—Application—Service.** Service of the application may be accomplished by postage prepaid first class mail or by personal delivery. Service is deemed effected at the time of mailing (if by mail) or at the time of personal delivery (if by personal delivery).

[Order 75-14, § 296-350-35020, filed 4/14/75.]

WAC 296-350-35025 **Extension of abatement date(s)—Application—Contents.** (1) The application for an extension of an abatement date or dates shall include:

- (a) The name of the applicant employer;
- (b) The address of the workplace or workplaces to which the application applies;
- (c) Identification of the CITATION which includes the abatement date(s) for which an extension is sought;
- (d) Identification of the specific abatement date(s) for which an extension is sought;
- (e) A statement of the actions the employer has taken to attempt to comply with the subject abatement date(s);
- (f) An identification of those factors, beyond the control of the employer, which have prevented or will prevent the employer from complying with the subject abatement date(s);
- (g) The length(s) of time sought for the extension(s);
- (h) The means of protecting employees during time employer is coming into compliance.

[Order 75-14, § 296-350-35025, filed 4/14/75.]

WAC 296-350-35030 **Extension of abatement date(s)—Provisional determination.** Upon receipt of the application the assistant director shall make a provisional determination to extend the subject abatement date(s) or to deny the application. The assistant director may conduct whatever investigation he/she deems proper prior to making the determination. The determination shall be in effect unless a hearing is requested in accordance with the provisions of these rules.

[Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 42.30 and 43.22 RCW. 80-17-014 (Order 80-20), § 296-350-35030, filed 11/13/80; Order 75-14, § 296-350-35030, filed 4/14/75.]

WAC 296-350-35035 Extension of abatement date(s)—Notice of application—Notice of opportunity for hearing—Notice of provisional determination. (1) Following the making of the provisional determination according to WAC 296-350-35030 but no later than five working days after the receipt of the application the assistant director shall issue the following notices:

(a) A notice of receipt of the application, which shall include reference to the subject abatement dates;

(b) A notice of opportunity for a hearing on the application;

(c) A notice of provisional determination on the application.

(2) The assistant director may combine the notices required by the section on one document.

(3) The notices required by this section shall be signed by the assistant director, shall include the date of issuance by the assistant director and shall include the address to which requests for a hearing, if any, shall be sent.

[Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 42.30 and 43.22 RCW. 80-17-014 (Order 80-20), § 296-350-35035, filed 11/13/80; Order 75-14, § 296-350-35035, filed 4/14/75.]

WAC 296-350-35040 Extension of abatement date(s)—Posting. (1) Immediately upon receipt, the notices issued in accordance with WAC 296-350-35035 shall be posted with the CITATION or CITATIONS which include the abatement date(s) for which an extension(s) is sought.

(2) The notices issued in accordance with WAC 296-350-35035 shall remain posted until the provisional abatement date(s) identified on the notice, or if a hearing is requested pursuant to WAC 296-350-35045, until a notice for hearing on the application for extension is posted.

[Order 75-14, § 296-350-35040, filed 4/14/75.]

WAC 296-350-35045 Extension of abatement date(s)—Application for hearing. (1) A hearing on the application for extension of abatement(s) may be applied for by the employer, an affected employee or employees of the employer or an authorized representative of such affected employees.

(2) Applications for hearings on application for extension of abatement date(s) shall be made to the assistant director at the address identified on the notice(s) issued pursuant to WAC 296-350-35035.

(3) Applications for hearings shall be served on the assistant director, according to the provisions of WAC 296-350-35020, at the address identified in the applicable notice not later than ten calendar days following the issuance of the notice.

[Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 42.30 and 43.22 RCW. 80-17-014 (Order 80-20), § 296-350-35045, filed 11/13/80; Order 75-14, § 296-350-35045, filed 4/14/75.]

WAC 296-350-35050 Extension of abatement date(s)—Notice of hearing. (1) Upon receipt of a request for a hearing filed in accordance with WAC 296-350-35045 the assistant director shall issue a notice of hearing to the applicant and the employer stating that the opportunity will be afforded to all interested parties to participate in a hearing on the application for an extension of abatement date(s).

(2) The notice of hearing shall fix the time and date for such hearing such that the parties can reasonably be expected to receive the notice of hearing not less than twenty days in advance of the date set for the hearing.

(3) The notice of hearing shall state the time, place, and nature of the proceeding; the legal authority and jurisdiction under which the hearing is to be held; a reference to the particular sections of the statute and the rules involved; and a short and plain statement of the matters asserted.

(4) The notice of hearing, or a complete copy thereof, shall be posted by the employer with the citation containing the abatement date(s) for which an extension is sought and the notice(s) issued in accordance with WAC 296-350-35035, and shall remain posted until the date and time set for the hearing.

[Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 42.30 and 43.22 RCW. 80-17-014 (Order 80-20), § 296-350-35050, filed 11/13/80; Order 75-14, § 296-350-35050, filed 4/14/75.]

WAC 296-350-35055 Extension of abatement date(s)—Hearings. (1) The assistant director shall designate department personnel to act as hearing officers at hearings on applications for extension of abatement date(s).

(2) A hearing officer shall be present and preside over the proceedings at all hearings conducted. The hearing officer may be accompanied by an assistant attorney general who shall be able to render legal advice to the hearing officer. The assistant attorney general may, at the hearing officer's request, preside over the proceedings.

(3) Prior to the commencement of the hearing, the hearing officer may confer with the parties attending the hearing concerning the material to be presented for the record in order to determine an orderly method of procedure.

(4) The provisions of chapter 34.04 RCW are applicable to hearings conducted pursuant to the provisions of this section.

(5) All proceedings relating to a hearing under this section shall be recorded mechanically or otherwise. Copies of transcripts of such recordings will be made available to any parties involved, upon request therefore and payment of the reasonable costs thereof.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-350-35055, filed 7/20/94, effective 9/20/94. Statutory Authority: RCW 49.17.040 and 49.17.050. 82-13-045 (Order 82-22), § 296-350-35055, filed 6/11/82. Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 42.30 and 43.22 RCW. 80-17-014 (Order 80-20), § 296-350-35055, filed 11/13/80; Order 75-14, § 296-350-35055, filed 4/14/75.]

WAC 296-350-35060 Extension of abatement date(s)—Decision and order. (1) Following the conclusion of a hearing conducted pursuant to the provisions of this section, the assistant director shall issue an order affirming or modifying the abatement date(s) which is the subject of the application for extension of abatement date(s). Such order shall be in conformance with the provisions of chapter 34.04 RCW and chapter 296-08 WAC relating to practice and procedure in contested cases, as now or hereafter amended.

(2) A complete and unedited copy of the order issued pursuant to subsection (6) of this section shall be posted, immediately upon receipt, with the CITATION or CITATIONS

which include the abatement date(s) to which the order applies.

[Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 42.30 and 43.22 RCW. 80-17-014 (Order 80-20), § 296-350-35060, filed 11/13/80; Order 75-14, § 296-350-35060, filed 4/14/75.]

WAC 296-350-400 Posting of notices—Posting of citation and notice—Availability of act and applicable standards. (1) Definitions. The definitions of WAC 296-350-010 and 296-27-020 shall apply to this section.

(2) Each employer shall post and keep posted a notice or notices (the WISHA poster, Job safety and health protection, F416-081-000) to be furnished by the division of consultation and compliance, department of labor and industries, informing employees of the protections and obligations provided for in the act and that for assistance and information, including copies of the act, and of specific safety and health standards employees should contact the employer or the nearest office of the department of labor and industries. Such notice or notices shall be posted by the employer at each establishment in a conspicuous place or places where notices to employees are customarily posted. Each employer shall take steps to assure that such notices are not altered, defaced or covered by other material.

(3) The notice identified in subsection (2) of this section shall be posted in each establishment of the employer as defined in WAC 296-27-020(8).

(4) All notices required to be posted by provisions of the act, provisions of this chapter or the provisions of any other safety and health standard, rule or regulation adopted pursuant to the authority of the act, shall be posted as required by this section, or as required by the act, or as required by the provision of the applicable safety and health standard, rule or regulation.

(5) Unless otherwise specified in this section, the act, or the applicable safety and health standard, rule or regulation, notices or other materials required to be posted, shall be posted in each establishment of the employer, as defined in WAC 296-27-020(8).

(6) Copies of the act, all regulations published in this chapter and all applicable standards shall be available at all regional offices of the department of labor and industries. If an employer has obtained copies of these materials, he/she shall make them available upon request to any employee or his/her authorized representative on the same day the request is made, or at the earliest time mutually convenient to the employee or his/her authorized representative and the employer, for review by the requesting employee or authorized representative.

(7) Any employer failing to comply with the provisions of this section shall be subject to citation and penalty in accordance with the provisions of section 12 and 18 of the act. (RCW 49.17.120 and 49.17.180.)

(8) Documents required to be posted include, but shall not be limited to the following:

(a) A copy or copies of an application or applications for a variance or variances from any safety and health standards applied for in accordance with RCW 49.17.080 or 49.17.090 shall be posted at each establishment to which the variance, if granted, will apply. The manner of posting such

applications shall be in accordance with subsections (4) and (5) of this section.

(b) Upon receipt of any **citation and notice** issued by the department pursuant to RCW 49.17.120 or 49.17.130, the employer shall immediately post the **citation and notice** or a copy thereof in a prominent place at or near each place a violation referred to in the **citation and notice** occurred. Where, because of the nature of the employer's operations, it is not practicable to post the **citation and notice** or a copy thereof at or near each place of violation, the **citation and notice** or a copy thereof shall be posted in the establishment of the employer, as defined in WAC 296-27-020(8).

The posted **citation and notice** or copy thereof shall be complete and shall not be abstracted, edited or otherwise changed from the original. The posted **citation and notice** or copy thereof shall be readily visible, and shall not be defaced or covered by other material.

The **citation and notice** or copy thereof shall remain posted as required by this subsection until all violations have been abated, or for three working days, whichever is longer. Whenever an employer verifies abatement of a violation in writing, see WAC 296-27-16009, a copy of the written verification shall be posted with the **citation and notice** for at least three working days.

(c) A copy of the notice of filing of appeal pursuant to RCW 49.17.140, the notice of conference pursuant to WAC 263-12-090, and the notice of hearing pursuant to WAC 263-12-100 shall be posted by the employer at each establishment to which the notices apply in a conspicuous place or places where notices to employees are customarily posted. The manner of posting such notices shall be in accordance with subsections (4) and (5) of this section.

(d) In the event that a proposed agreement settling an appeal of a citation and notice to the board of industrial insurance appeals is reached between the employer and the department without the concurrence of the affected employees or employee groups, a copy of the proposed agreement shall be posted by the employer at each establishment to which the agreement applies in a conspicuous place or places where notices to employees are customarily posted. The agreement shall be posted for 10 days before it is filed with the board of industrial insurance appeals. The manner of posting shall be in accordance with subsections (4) and (5) of this section.

(e) Notices required to be posted by specific provisions of any safety and health standard or other rule or regulation duly adopted by the director shall be posted according to the standard, rule or regulation requiring such posting. If the provision containing the requirement for posting does not specify the manner of posting, such posting shall conform to the requirements of subsections (4) and (5) of this section.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-350-400, filed 7/20/94, effective 9/20/94; 91-24-017 (Order 91-07), § 296-350-400, filed 11/22/91, effective 12/24/91. Statutory Authority: RCW 49.17.040 and 49.17.050. 86-03-064 (Order 86-02), § 296-350-400, filed 1/17/86; 82-13-045 (Order 82-22), § 296-350-400, filed 6/11/82; Order 75-14, § 296-350-400, filed 4/14/75. Formerly WAC 296-27-200.]

WAC 296-350-450 Complaints by employees or their representatives. (1) Any employee or representative of employees who in good faith believes that a violation of any safety or health standard or an imminent danger exists

in any workplace where such employee is employed may request an inspection of such workplace by giving notice of the alleged violation or danger to any office or officer of the division of consultation and compliance of the department. Any such notice shall be reduced to writing, shall set forth with reasonable particularity the grounds for the notice, and shall be signed by the employee or representative of employees. A copy shall be provided the employer or his/her agent by an officer of the division no later than at the time of inspection, if any, except that upon the request of the person giving such notice, his/her name and the names of individual employees referred to therein shall not appear in such copy or on any record published, released, or made available by the department of labor and industries.

(2) If upon receipt of such notification it is determined that the complaint meets the requirements set forth in subsection (1) of this section, and that there are reasonable grounds to believe that the alleged violation or danger exists, an inspection shall be made as soon as practicable, to determine if such alleged violation or danger exists. Inspections under this section may extend beyond the matters referred to in the complaint.

(3) Prior to or during any inspection of a workplace, any employee or representative of employees employed in such workplace may notify the inspector, in writing, of any violation of the act or safety or health standard he/she has reason to believe exists in such workplace. Any such notice shall comply with the requirements of subsection (1) of this section.

(4) RCW 49.17.160(1) provides: "No person shall discharge or in any manner discriminate against any employee because such employee has filed any complaint or instituted or caused to be instituted any proceeding under or related to this chapter or has testified or is about to testify in such proceeding or because of the exercise of such employee on behalf of himself or others of any right afforded by this chapter."

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-350-450, filed 7/20/94, effective 9/20/94; Order 75-14, § 296-350-450, filed 4/14/75.]

WAC 296-350-460 Complaints—Inspection not warranted—Informal review. (1) If it is determined that an inspection is not warranted because there are no reasonable grounds to believe that a violation or danger exists with respect to a complaint received pursuant to WAC 296-350-450, the complaining party shall be notified in writing of such determination. The complaining party may obtain informal review of such determination by submitting a written statement of position with the assistant director requesting such review. Upon the request of the complaining party, the assistant director or his/her designee, at his/her discretion, may hold an informal conference in which the complaining party may present his/her views orally or in writing. After considering all written and oral views presented, the assistant director or his/her designee shall affirm, modify, or reverse the original determination and furnish the complaining party with written notification of his/her decision and the reasons therefor.

(2) If the assistant director or his/her designee, determines that an inspection is not warranted because the

requirements of WAC 296-350-460(1) have not been met, he/she shall notify the complaining party in writing of such determination. Such determination shall be without prejudice to the filing of a new complaint meeting the requirements of WAC 296-350-460(1).

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-350-460, filed 7/20/94, effective 9/20/94. Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 42.30 and 43.22 RCW. 80-17-014 (Order 80-20, § 296-350-460, filed 11/13/80; Order 75-41, § 296-350-460, filed 12/19/75; Order 75-14, § 296-350-460, filed 4/14/75.)]

WAC 296-350-470 Citation not issued following complaint. (1) If a citation or notice of de minimis violations is issued for a violation alleged in a request for inspection under WAC 296-350-450(3), a copy of the citation or notice of de minimis violations shall also be sent to the employee or representative of employees who gave such notification.

(2) After an inspection, if it is determined that a citation is not warranted with respect to a danger or violation alleged to exist in a request for inspection under WAC 296-350-360(1), or a notification of violation under WAC 296-350-450(3), the informal review procedures prescribed in WAC 296-350-460(1) shall be applicable. After considering all views presented, the assistant director or his/her designee, shall affirm the determination, order a reinspection, or issue a citation if he/she believes that the inspection disclosed a violation.

(3) The assistant director or his/her designee shall furnish the complaining party and the employer with written notification of his/her determination and the reasons therefor.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-350-470, filed 7/20/94, effective 9/20/94. Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 42.30 and 43.22 RCW. 80-17-014 (Order 80-20), § 296-350-470, filed 11/13/80; Order 75-14, § 296-350-470, filed 4/14/75.]

WAC 296-350-500 Citation and notice—Copy to employee representative. (1) RCW 49.17.120 provides in pertinent part

"The director shall provide by rule for procedures to be followed by an employee representative upon written application to receive copies of **citations and notices** issued to any employer having employees who are represented by such employee representative. Such rule may prescribe the forms of such application, the time for renewal of applications, and the eligibility of the applicant to receive copies of **citations and notices**."

(2) "Employee representative" means:

(a) Any officer of the recognized bargaining agent of employees, acting on behalf of the employees of the employer.

(b) Any employee representative of an employer-employee safety committee within an establishment or the firm of the employer.

(c) Any employee of an employer who has been selected by the employees of that employer to act as their representative for the purposes indicated in subsection (1) of this section. Such selection shall be evidenced by a letter or other written communication to the division of consultation

and compliance stating the name of the employee so selected and signed by not less than one-half of the employees of the employer so represented.

(3) An employee representative may receive copies of **citations and notices** issued to any employer having employees who are represented by such employee representative upon the filing of a complete application Form F418-023-000, a facsimile of which constitutes Appendix A of this section, with the Division of Consultation and Compliance, Department of Labor and Industries, P.O. Box 44600 Olympia, Washington 98504-4600.

(4) In the event that the director or his/her authorized representative finds that application for copies of the **citation and notice** have been received by more than one employee representative of the same employees of the employer, the director or his/her authorized representative may elect which of the applicants to which the copies of the **citation and notice** shall be sent.

(5) The director or his/her authorized representative may deny an application for copies of **citations and notices** upon finding that the applicant is not an employee representative as defined in subsection (2) of this section or upon finding that more than one employee representative of the same employees has applied for copies of **citations and notices**.

(6) An application for copies of **citations and notices** may be granted for a period not exceeding one year and may be renewed upon re-application for another one year period. The director or his/her authorized representative may, at the request of the applicant, waive the one year limitation.

(7) Upon the granting of the application for copies of **citations and notices**, the applicant shall be informed of the granting and of the date on which that grant shall expire.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-350-500, filed 7/20/94, effective 9/20/94; 87-24-051 (Order 87-24), § 296-350-500, filed 11/30/87. Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 42.30 and 43.22 RCW. 80-17-014 (Order 80-20), § 296-350-500, filed 11/13/80; Order 75-14, § 296-350-500, filed 4/14/75.]

WAC 296-350-990 Appendix A—Form F418-023-000—Application for copies of citations and notices.

APPENDIX A

DEPT. OF LABOR & INDUSTRIES
Div. of Industrial Safety & Health
P.O. Box 207
Olympia, WA 98504

APPLICATION FOR COPIES OF CITATION AND NOTICES
ISSUED PURSUANT TO THE WASHINGTON INDUSTRIAL SAFETY AND HEALTH ACT

Any employee of an employer who has been selected by the employees of that employer to act as their representative as defined in WAC 296-350-500 may apply for copies of CITATION AND NOTICES issued to said employer.

DEFINITION:

WAC 296-350-500(2) - "Employee representative" means:

- (a) Any officer of the recognized bargaining unit of employees, acting on behalf of the employees of the employer.
- (b) Any employee representative of an employer-employee safety committee within an establishment of the firm of the employer.
- (c) Any employee of an employer who has been selected by the employees of that employer to act as their representative for the purposes indicated in subsection (1) of this section. Such selection shall be evidenced by a letter or other written communication to the Division of Industrial Safety and Health stating the name of the employee so selected and signed by not less than one-half of the employees of the employer.

Applicant certifies he/she is an employee representative by virtue of WAC 296-350-500(2)

CERTIFICATION: I HEREBY CERTIFY UNDER PENALTY OF PERJURY THAT THE ABOVE STATEMENT IS TRUE TO THE BEST OF MY KNOWLEDGE.

Signature	position	date

Name and address of applicant to which copies of CITATION AND NOTICES should be sent:

Name, address and Labor & Industries account I.D. and/or Unified Business Identifier of EMPLOYER HAVING EMPLOYEES WHO ARE REPRESENTED by the applicant (please give full information for each employer you represent - use extra paper if required):

The director or his/her authorized representative may deny this application if more than one employee representative has applied or if the applicant does not qualify as an employee representative.

For Department Use Only		
Application Rcvd. _____	Application Granted by _____	Date Application Granted _____
Applicant Notified _____	Expiration Date _____	
Comment:		

F418-023-000 app for copies of citation and notice 4-87 (Wish 300)

[Statutory Authority: Chapter 49.17 RCW. 87-24-051 (Order 87-24), § 296-350-990, filed 11/30/87. Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 42.30 and 43.22 RCW. 80-17-014 (Order 80-20), § 296-350-990, filed 11/13/80; Order 75-14, Appendix A—Form 300 (codified as WAC 296-350-990), filed 4/14/75.]

Chapter 296-360 WAC

DISCRIMINATION, PURSUANT TO RCW 49.17.160

WAC

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296-360-150	Discrimination because of exercise of right afforded by WISHA—Refusal to work in an unsafe condition.
296-360-160	Payment of damages to employee discriminated against.
296-360-170	Employee's refusal to comply with safety rules.

WAC 296-360-005 Definitions. For the purposes of this chapter.

(1) "Assistant director" - the assistant director for the division of consultation and compliance.

(2) "Division" - the division of consultation and compliance of the department of labor and industries.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-360-005, filed 7/20/94, effective 9/20/94. Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 43.22 and 42.30 RCW. 80-17-015 (Order 80-21), § 296-360-005, filed 11/13/80.]

WAC 296-360-010 Introduction. (1) Chapter 49.17 RCW, the Washington Industrial Safety and Health Act (WISHA), is designed to regulate employment conditions affecting industrial safety and health and to achieve safer and healthier work places throughout the state. WISHA requires every person who has employees to furnish each of his or her employees employment and a place of employment free from recognized hazards that are causing or likely to cause death or serious physical harm, and to comply with industrial safety and health standards promulgated under WISHA.

(2) Employees and representatives of employees are afforded a wide range of substantive and procedural rights under WISHA. Effective implementation of WISHA and achievement of its goals depend in large part upon the active but orderly participation of employees, individually and through their representatives.

(3) This chapter deals essentially with the rights of employees afforded under RCW 49.17.160. RCW 49.17.160 prohibits reprisals, in any form, against employees who exercise rights under WISHA. The purpose of this chapter is to make available in one place interpretations of the various provisions of section 16 of WISHA that will guide the assistant director in the performance of his or her duties thereunder.

[Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 43.22 and 42.30 RCW. 80-17-015 (Order 80-21), § 296-360-010, filed 11/13/80.]

(1997 Ed.)

WAC 296-360-020 General requirements of RCW 49.17.160 of WISHA. RCW 49.17.160 provides that no person shall discharge or in any manner discriminate against any employee because the employee has filed any complaint under or related to WISHA, instituted or caused to be instituted any proceeding under or related to WISHA, testified or is about to testify in any proceeding under or related to WISHA, or exercised on his or her own behalf or on behalf of others any right afforded by WISHA. Any employee who believes that he/she has been discriminated against in violation of section 16 of WISHA may, within thirty days after the violation occurs, file a complaint with the assistant director alleging the violation. The division shall investigate the complaint and, if the assistant director determines that section 16 of WISHA has been violated, the division may bring a civil action against the violator in superior court. The suit may ask the court to restrain violations of RCW 49.17.160 and to grant other appropriate relief, including rehiring or reinstating the employee to his or her former position with back pay.

[Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 43.22 and 42.30 RCW. 80-17-015 (Order 80-21), § 296-360-020, filed 11/13/80.]

WAC 296-360-030 Filing a complaint of discrimination. (1) Who may file. A complaint of RCW 49.17.160 discrimination may be filed by the employee him- or herself, or by a representative authorized to do so on his or her behalf.

(2) Nature of filing. No particular form of complaint is required.

(3) Place of filing. The complaint should be filed with the division.

(4) Time for filing. RCW 49.17.160(3) provides that an employee who believes that he or she has been discriminated against in violation of RCW 49.17.160 "may, within thirty days after such violation occurs" file a complaint with the assistant director. A major purpose of the thirty-day period is to allow the assistant director to decline to entertain complaints that have become stale. Accordingly, the division will presume that complaints not filed within thirty days of an alleged violation are untimely. There may be circumstances, however, that justify tolling the thirty-day period on recognized equitable principles or because strongly extenuating circumstances exist, e.g., where the employer has concealed, or misled the employee regarding the grounds for, discharge or other adverse action. In the absence of circumstances justifying a tolling of the thirty-day period, the division shall not accept untimely complaints.

[Statutory Authority: RCW 49.17.040 and 49.17.050. 82-13-045 (Order 82-22), § 296-360-030, filed 6/11/82. Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 43.22 and 42.30 RCW. 80-17-015 (Order 80-21), § 296-360-030, filed 11/13/80.]

WAC 296-360-040 Notification of assistant director's determination. (1) RCW 49.17.160(3) provides that the assistant director is to notify a complainant within ninety days of the complaint of his determination whether prohibited discrimination has occurred. This ninety-day provision is directory, not mandatory. Although every effort will be made to notify complainants of the assistant director's

determination within ninety days, there may be instances when it is not possible to do so.

(2) If a complainant receives a determination from the assistant director that prohibited discrimination has not occurred, the complainant may file a written request for review by the director within fifteen working days of receipt of the determination. The request for review must set forth the basis for the request. The request shall be filed by mailing or delivering the request to the Director of Labor and Industries, P.O. Box 44000, Olympia, Washington 98504-4000. Upon review the director may set aside the assistant director's determination, remand the matter for further investigation, or affirm the determination of the assistant director. The director shall notify the complainant of the decision after review.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-360-040, filed 7/20/94, effective 9/20/94. Statutory Authority: RCW 49.17.040 and 49.17.050. 85-10-004 (Order 85-09), § 296-360-040, filed 4/19/85. Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 43.22 and 42.30 RCW. 80-17-015 (Order 80-21), § 296-360-040, filed 11/13/80.]

WAC 296-360-050 Withdrawal of complaint.

Enforcing the provisions of RCW 49.17.160 is not only a matter of protecting rights of individual employees, but also of protecting the public interest. Attempts by an employee to withdraw a filed complaint will not necessarily result in termination of the division's investigation. The division's jurisdiction cannot be foreclosed as a matter of law by unilateral action of the employee. However, a voluntary and uncoerced request from a complainant to withdraw his/her complaint shall generally be accepted.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-360-050, filed 7/20/94, effective 9/20/94. Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 43.22 and 42.30 RCW. 80-17-015 (Order 80-21), § 296-360-050, filed 11/13/80.]

WAC 296-360-060 Arbitration or other agency proceedings. (1) General.

(a) An employee who files a complaint under RCW 49.17.160 may pursue remedies under grievance arbitration proceedings in collective bargaining agreements, and may also resort to other agencies, such as the National Labor Relations Board, for relief. The division's jurisdiction to entertain RCW 49.17.160 complaints, to investigate, and to determine whether discrimination has occurred, is independent of the jurisdiction of other agencies or bodies. The division may file an action in superior court regardless of the pendency of other proceedings.

(b) Where it is possible, however, the division favors voluntary resolution of disputes under procedures in collective bargaining agreements. Also, the division should defer to the jurisdiction of other forums established to resolve disputes that may also be related to RCW 49.17.160 complaints. Thus, where a complainant is pursuing remedies other than those provided by RCW 49.17.160 it may be proper to postpone the assistant director's determination whether discrimination has occurred, and defer to the results of such proceedings.

(2) Postponement of determination. Postponement of determination is justified where the rights asserted in other proceedings are substantially the same as rights under RCW

49.17.160 and those proceedings are not likely to violate the rights guaranteed by RCW 49.17.160. The factual issues in the such proceedings must be substantially the same as those raised by the RCW 49.17.160 complaint, and the forum hearing the matter must have the power to determine the ultimate issue of discrimination.

(3) Deferral to outcome of other proceedings. Determinations to defer to the outcome of another proceeding begun by a complainant must be made after careful scrutiny. It must be clear that the proceeding dealt adequately with all factual issues, that it was fair, regular, and free of procedural infirmities, and that its outcome did not violate the purpose and policy of WISHA. If another action begun by a complainant is dismissed without an adjudicatory hearing on the merits, the division will not necessarily regard the dismissal as determinative of the merits of the RCW 49.17.160 complaint.

[Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 43.22 and 42.30 RCW. 80-17-015 (Order 80-21), § 296-360-060, filed 11/13/80.]

WAC 296-360-070 Persons prohibited from discriminating. RCW 49.17.160 specifically states that "no person shall discharge or in any manner discriminate against any employee" because the employee has exercised rights under WISHA. RCW 49.17.020(5), defines "person" as "one or more individuals, partnerships, associations, corporations, business trusts, legal representatives, or any organized group of persons." Consequently, the prohibitions of RCW 49.17.160 are not limited to actions taken by employers against their own employees. A person may be charged with discriminating against an employee of another person. RCW 49.17.160 extends to such entities as organizations representing employees in collective bargaining, employment agencies, or any other person in a position to discriminate against an employee. See *Meek v. United States*, 136 F.2d 679 (6th Cir., 1943); *Bowe v. Judson C. Burns*, 137 F.2d 37 (3rd Cir., 1943).

[Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 43.22 and 42.30 RCW. 80-17-015 (Order 80-21), § 296-360-070, filed 11/13/80.]

WAC 296-360-080 Persons protected by RCW 49.17.160. (1) All employees are afforded the full protection of RCW 49.17.160. WISHA defines an employee as "an employee of an employer who is employed in a business of his/her employer which affects commerce." RCW 49.17.020(4). WISHA does not define "employ"; however, the broad remedial nature of WISHA demonstrates a clear intent that the existence of an employment relationship, for purposes of RCW 49.17.160, is to be based upon economic realities rather than upon common law doctrines and concepts. See *U.S. v. Silk*, 331 U.S. 704 (1947); *Rutherford Food Corporation v. McComb*, 331 U.S. 722 (1947).

(2) For purposes of RCW 49.17.160, an applicant for employment could be considered an employee. See *NLRB v. Lamar Creamery*, 246 F.2d 8 (5th Cir., 1957).

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-360-080, filed 7/20/94, effective 9/20/94. Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 43.22 and 42.30 RCW. 80-17-015 (Order 80-21), § 296-360-080, filed 11/13/80.]

WAC 296-360-090 Unprotected activities distinguished. (1) An employer or others may base actions that adversely affect an employee upon nondiscriminatory grounds. An employee's engagement in activities protected by WISHA does not automatically render him/her immune from discharge or discipline for legitimate reasons, or from adverse action dictated by nonprohibited considerations. See *NLRB v. Dixie Motor Coach Corp.* 128 F.2d 201 (5th Cir., 1942).

(2) To establish a violation of RCW 49.17.160, the employee's engagement in protected activity need not be the sole consideration behind discharge or other adverse action. If protected activity was a substantial reason for the action, or if the discharge or other adverse action would not have taken place "but for" the employee's engagement in protected activity, RCW 49.17.160 has been violated.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-360-090, filed 7/20/94, effective 9/20/94. Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 43.22 and 42.30 RCW. 80-17-015 (Order 80-21), § 296-360-090, filed 11/13/80.]

WAC 296-360-100 Discrimination because of a complaint under or related to WISHA. RCW 49.17.160 prohibits discharge of, or discrimination against, an employee because the employee has filed any complaint under or related to this act.

(1) An example of a complaint made "under" WISHA would be an employee request for inspection pursuant to section 11 (RCW 49.17.110). This is not the only type of complaint protected by RCW 49.17.160, however. The range of complaints "related to" WISHA is commensurate with the broad remedial purposes of this legislation and the sweeping scope of its application.

(2) Complaints registered with other state or federal agencies that have the authority to regulate or investigate industrial safety and health conditions are complaints "related to" WISHA.

(3) The protection offered employees by WISHA would be seriously undermined if employees were discouraged from lodging complaints about industrial safety and health matters with their employers. Complaints to employers, if made in good faith, are related to WISHA, and an employee is protected against discharge or discrimination caused by a complaint to the employer.

(4) To come within the protection of RCW 49.17.160, a complaint must relate to conditions at the work place, as distinguished from complaints touching only upon general public safety and health.

[Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 43.22 and 42.30 RCW. 80-17-015 (Order 80-21), § 296-360-100, filed 11/13/80.]

WAC 296-360-110 Discrimination because of a proceeding under or related to the act. (1) RCW 49.17.160 prohibits discharge of, or discrimination against, any employee because the employee has "instituted or caused to be instituted any proceeding under or related to WISHA." Proceedings that can arise specifically under WISHA include inspections of worksites under RCW 49.17.070, employee contest of an abatement date under RCW 49.17.140, employee initiation of proceedings for promulgation of an industrial safety and health standard, employee application for modifi-

cation or revocation of a variance under RCW 49.17.080, employee judicial challenge of a standard, and employee appeal of board of industrial insurance appeals order under RCW 49.17.140. In determining whether a "proceeding" is "related to" WISHA, the considerations discussed in WAC 296-360-100 are also applicable.

(2) An employee need not directly institute a proceeding. It is sufficient if he or she sets into motion acts of others that result in proceedings under or related to WISHA.

[Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 43.22 and 42.30 RCW. 80-17-015 (Order 80-21), § 296-360-110, filed 11/13/80.]

WAC 296-360-120 Discrimination because of testimony. RCW 49.17.160 prohibits discharge of, or discrimination against, any employee because the employee "has testified or is about to testify" in proceedings under or related to WISHA. This protection is not limited to testimony in proceedings instituted or caused to be instituted by the employee, but extends to any statements given in the course of judicial, quasijudicial, and administrative proceedings, including inspections, investigations, administrative adjudications, and rules hearings.

[Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 43.22 and 42.30 RCW. 80-17-015 (Order 80-21), § 296-360-120, filed 11/13/80.]

WAC 296-360-130 Discrimination because of exercise of any right afforded by WISHA—In general. In addition to protecting employees who file complaints, institute proceedings, or testify in proceedings under or related to WISHA, RCW 49.17.160 also protects employees from discrimination occurring because of the exercise "of any right afforded by this chapter." Certain rights are explicitly stated in WISHA. Other rights exist by necessary implication. For example, employees may request information from the occupational safety and health administration or the department of labor and industries. Also, employees interviewed by agents of the division in the course of inspections or investigations cannot subsequently be discriminated against because of their cooperation.

[Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 43.22 and 42.30 RCW. 80-17-015 (Order 80-21), § 296-360-130, filed 11/13/80.]

WAC 296-360-140 Discrimination because of exercise of right afforded by WISHA—Walkaround pay. Employee participation in walkaround inspections under RCW 49.17.100 is essential. Employees are a vital source of information to the division about work place hazards. Employees must be able freely to exercise their statutory right to participate in walkarounds without fear of economic loss, such as the denial of pay for the time spent helping WISHA inspectors during the walkaround. To ensure the unimpeded flow of information to the inspectors, and the unfettered statutory right of employees to participate in walkaround inspections, an employer's failure to pay employees for time they spend in walkaround inspections is discrimination under RCW 49.17.160. In addition, an employer's failure to pay employees for time spent in other inspection-related activities, such as answering questions of inspectors or participating in the opening and closing conferences, is discrimination under RCW 49.17.160.

[Statutory Authority: Chapter 49.17 RCW. 94-15-096 (Order 94-07), § 296-360-140, filed 7/20/94, effective 9/20/94. Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 43.22 and 42.30 RCW. 80-17-015 (Order 80-21), § 296-360-140, filed 11/13/80.]

WAC 296-360-150 Discrimination because of exercise of right afforded by WISHA—Refusal to work in an unsafe condition. (1) Review of WISHA and examination of the legislative history discloses that, as a general matter, WISHA grants no specific right to employees to walk off the job because of potential unsafe conditions at the work place. A hazardous condition that may violate WISHA will ordinarily be corrected by the employer, once brought to its attention. If the employer does not correct a hazard, or if there is a dispute about the existence of a hazard, the employee normally can ask the division to inspect the work place pursuant to RCW 49.17.110, or can seek help from other public agencies that have responsibility for safety and health. Under such circumstances, an employer would not violate RCW 49.17.160 by disciplining an employee who refuses to work because of an alleged safety or health hazard.

(2) Occasions arise, however, when an employee is confronted with a choice between not performing assigned tasks or subjecting him- or herself to serious injury or death arising from a hazard at the work place. If the employee, with no reasonable alternative, refuses in good faith to expose him- or herself to the dangerous condition, he or she is protected against subsequent discrimination.

(3) An employee's refusal to work is protected if he or she meets the following requirements:

(a) The refusal to work must be in good faith, and must not be a disguised attempt to harass the employer or disrupt the employer's business;

(b) The hazard causing the employee's apprehension of death or injury must be such that a reasonable person, under the circumstances then confronting the employee, would conclude that there is a real danger of death or serious injury; and

(c) There must be insufficient time, due to the urgency of the situation, to eliminate the danger through resort to regular statutory enforcement channels.

(4) As indicated in subsection (3), an employee's refusal to work is not protected unless it is a good faith response to a hazardous condition. To determine whether an employee has acted in good faith, the division will consider, among other factors, whether the employee:

(a) Asked the employer to correct the hazard;

(b) Asked for other work;

(c) Remained on the job until ordered to leave by the employer; or

(d) Informed the employer that, if the hazard was not corrected, the employee would refuse to work.

The lack of one or more of these factors shall not necessarily preclude a finding of good faith if other factors do establish good faith. The division will also consider whether the employer knew that the hazard could cause serious injury or death, or that the hazard was prescribed by a specific safety standard promulgated under WISHA or any other law that relates to the safety and health of a place of employment.

[Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 43.22 and 42.30 RCW. 80-17-015 (Order 80-21), § 296-360-150, filed 11/13/80.]

WAC 296-360-160 Payment of damages to employee discriminated against. (1) If an employer discriminates against an employee such that the employee earns less than he or she would have earned absent the discrimination, the employer shall pay the employee the difference between the wages that the employee would have earned absent the discrimination and the wages the employee actually earned after the discrimination.

(2) If an employer discriminates against an employee for a refusal to work that is protected under WAC 296-360-150, the employer need not pay the employee's wages for the time spent fixing the hazard, or that would have been spent fixing the hazard, if the employer (a) had to or would have had to shut down the job to make the repair and (b) had not other work the employee could have done.

[Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 43.22 and 42.30 RCW. 80-17-015 (Order 80-21), § 296-360-160, filed 11/13/80.]

WAC 296-360-170 Employee's refusal to comply with safety rules. An employee who refuses to comply with industrial safety and health standards or valid safety rules implemented by the employer in furtherance of WISHA is not exercising a right afforded by WISHA. Discipline taken by employers solely in response to an employee's refusal to comply with appropriate safety rules and regulations is not discrimination prohibited by RCW 49.17.160. This situation should be distinguished from refusals to work discussed in WAC 296-360-150.

[Statutory Authority: RCW 49.17.040, 49.17.050, 49.17.240, chapters 43.22 and 42.30 RCW. 80-17-015 (Order 80-21), § 296-360-170, filed 11/13/80.]

Chapter 296-400 WAC

CERTIFICATION OF COMPETENCY FOR JOURNEYMAN PLUMBERS

WAC

296-400-005	Definitions.
296-400-020	Plumbers with license or practicing the plumbing trade at effective date of the act.
296-400-030	Issuing of temporary certificate.
296-400-035	Inactive status.
296-400-045	Plumber examination, certification, reinstatement, and temporary permit fees.
296-400-050	Meetings of governor's advisory board.
296-400-070	Reciprocity.
296-400-100	Computation of years of employment.
296-400-110	Previous experience credit.
296-400-120	Plumber trainee certificates.
296-400-130	Penalties for false statements or material misrepresentation.
296-400-140	Enforcement.
296-400-300	Procedures for notices of infraction.

DISPOSITION OF SECTIONS FORMERLY CODIFIED IN THIS CHAPTER

296-400-010	Examination fee and notification. [Order 73-20, § 296-400-010, filed 10/29/73.] Repealed by 83-19-044 (Order 83-26), filed 9/16/83. Statutory Authority: RCW 18.106.140 and 1983 c 124 § 10.
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296-400-040 Requirements for an apprentice permit. [Order 74-13, § 296-400-040, filed 4/15/74; Order 73-20, § 296-400-040, filed 10/29/73.] Repealed by Order 75-27, filed 8/4/75.

WAC 296-400-005 Definitions. Unless a different meaning is plainly required by the context, the following words and phrases as used in this chapter shall have the following meaning:

- (1) "Advisory board" means the state advisory board of plumbers;
- (2) "Department" means the department of labor and industries;
- (3) "Director" means the director of department of labor and industries;
- (4) "Journeyman plumber" means any person who has been issued a certificate of competency by the department of labor and industries as provided in this chapter;
- (5) "Specialty plumber" means anyone who has been issued a specialty certificate of competency limited to installation, maintenance, and repair of the plumbing of single family dwellings, duplexes, and apartment buildings which do not exceed three stories;
- (6) "Plumbing" means that craft involved in installing, altering, repairing, and renovating potable water systems and liquid waste systems within a building: *Provided*, That installation in a water system of water softening or water treatment equipment shall not be within the meaning of plumbing as used in this chapter;
- (7) "Trainee plumber" means any person being trained in the plumbing construction industry under the direct supervision of a journeyman plumber or specialty plumber working in his or her specialty.

[Statutory Authority: Chapter 18.106 RCW. 86-19-083 (Order 86-30), § 296-400-005, filed 9/17/86.]

WAC 296-400-020 Plumbers with license or practicing the plumbing trade at effective date of the act. Any applicant who is qualified to apply for and receive a certificate of competency under RCW 18.106.080 of the Plumbers Licensing Act (chapter 175, Laws of 1973 1st ex. sess.) must make his application therefor no later than November 30, 1973. All applications received after November 30, 1973 must be accompanied by the evidence of competency and experience required in RCW 18.106.030 of the act and the applicant must take the examination provided for in RCW 18.106.040 of the act. An applicant to be certified as a journeyman plumber must have had four or more years of experience under the direct supervision of a licensed journeyman plumber.

[Order 76-2, § 296-400-020, filed 1/30/76; Order 73-20, § 296-400-020, filed 10/29/73.]

WAC 296-400-030 Issuing of temporary certificate. The department may issue to an applicant one out-of-state temporary certificate before the examination of the applicant for a period of ninety days or less.

The applicant shall surrender the temporary certificate to the person conducting the examination when the applicant appears for the examination. If the applicant with a temporary certificate does not appear for the examination the

permit will expire on the expiration date specified on the permit.

[Statutory Authority: Chapter 18.106 RCW. 86-19-083 (Order 86-30), § 296-400-030, filed 9/17/86. Statutory Authority: RCW 18.106.140 and 1983 c 124 § 10. 83-19-044 (Order 83-26), § 296-400-030, filed 9/16/83; Order 74-13, § 296-400-030, filed 4/15/74; Order 73-20, § 296-400-030, filed 10/29/73.]

WAC 296-400-035 Inactive status. Persons requesting to be placed on inactive status shall be sixty-two years of age or older and shall not be employed in the trade of plumbing. They may request such status provided they are currently registered. They may return to active status upon payment of fee to the department without reexamination.

[Statutory Authority: Chapter 18.106 RCW. 86-19-083 (Order 86-30), § 296-400-035, filed 9/17/86.]

WAC 296-400-045 Plumber examination, certification, reinstatement, and temporary permit fees.

Examination fee:	\$ 100.00
Trainee certificate fee (1 year):	\$ 30.00
Issuance of trainee certificate for less than 1 year:	\$ 3.00 for each month of certificate period with a minimum fee of \$ 20.00

The trainee certificate shall expire one year from the date of issuance, and shall be renewed on or before the date of expiration.

Temporary permit fee:	\$ 50.00
Issuance or renewal of journeyman or specialty certificate fee (2 year):	\$ 80.00
Issuance of certificate for less than two years:	\$ 3.50 for each month of certificate period with a minimum fee of \$30.00

Reinstatement of journeyman or specialty certificate: \$ 160.00

Replacement of all certificates: \$ 30.00

Each person who has passed the examination for the plumbers certificate of competency and has paid the certificate fee shall be issued a certificate of competency that will expire on his or her birthdate. If the person was born in an even-numbered year, the certificate shall expire on the person's birthdate in the next even-numbered year. If the person was born in an odd-numbered year, the certificate shall expire on the person's birthdate in the next odd-numbered year.

[Statutory Authority: RCW 18.106.125. 89-12-004 (Order 89-04), § 296-400-045, filed 5/25/89; 88-06-037 (Order 87-32), § 296-400-045, filed 2/29/88. Statutory Authority: Chapter 18.106 RCW. 86-19-083 (Order 86-

30), § 296-400-045, filed 9/17/86. Statutory Authority: RCW 18.106.140 and 1983 c 124 § 10. 83-19-044 (Order 83-26), § 296-400-045, filed 9/16/83.]

WAC 296-400-050 Meetings of governor's advisory board. The governor's advisory board meetings will be regularly scheduled quarterly starting the third Tuesday of January.

[Statutory Authority: Chapter 18.106 RCW. 86-19-083 (Order 86-30), § 296-400-050, filed 9/17/86; Order 73-20, § 296-400-050, filed 10/29/73.]

WAC 296-400-070 Reciprocity. Persons applying for a journeyman or specialty plumbers certificate of competency who permanently reside in a state signatory to a reciprocal agreement with the state of Washington shall have a valid certificate of competency from the state in which they permanently reside.

Such persons shall not make application to take the journeyman or specialty plumbers examination in the state of Washington in lieu of taking an examination in their home state.

[Statutory Authority: Chapter 18.106 RCW. 86-19-083 (Order 86-30), § 296-400-070, filed 9/17/86.]

WAC 296-400-100 Computation of years of employment. (1) For the purposes of RCW 18.106.070(2), one thousand five hundred hours of employment shall be considered one year of employment.

(2) At the time of renewal, the holder shall provide the department with an accurate list of the holder's employers in the plumbing industry for the previous year and the number of hours worked for each employer on a form approved by and available from the department.

(3) A person who has completed a one, two, three, or four year trainee program in plumbing construction, shall be considered to have completed the necessary hours of training for the year in which they are registered.

[Statutory Authority: Chapter 18.106 RCW. 86-19-083 (Order 86-30), § 296-400-100, filed 9/17/86.]

WAC 296-400-110 Previous experience credit. A person who is applying for a plumber trainee certificate who has already worked in plumbing construction shall receive credit for all verifiable hours worked submitted on a form approved by and available from the department.

[Statutory Authority: Chapter 18.106 RCW. 86-19-083 (Order 86-30), § 296-400-110, filed 9/17/86.]

WAC 296-400-120 Plumber trainee certificates. (1) The department shall issue separate plumbing trainee certificates for the first, second, third, and fourth years of training. If a person has less than one thousand five hundred hours of employment as a plumber trainee in construction, the department shall give the individual a first year certificate; if more than one thousand four hundred ninety-nine but less than three thousand hours a second year certificate; if more than two thousand nine hundred ninety-nine but less than four thousand five hundred hours, a third year certificate; and if more than four thousand four hundred ninety-nine hours a fourth year certificate.

(2) A holder of a plumber trainee certificate may apply for the next year's certificate whenever he or she has sufficient documented hours of employment as a plumber trainee.

(3) A holder of a plumber trainee certificate may take the specialty plumber examination after completing four thousand five hundred hours of documented training and the journeyman examination after completing six thousand hours of documented training.

(4) A trainee making application for a journeyman certificate shall have completed a minimum of two years, of the required four years, as a trainee engaged in commercial plumbing.

(5) No person shall be issued a training certificate for more than eight years, except the department may consider extenuating circumstances.

(6) Journeyman plumber trainee. No trainee shall work without being under the direct supervision of a journeyman plumber, until such time as they have completed fifty-five hundred hours of training, and may continue to work without supervision until they achieve six thousand hours of training, at which time they shall be required to take the journeyman examination.

(7) A trainee who has failed the journeyman plumbers examination shall not be eligible to retake the examination for six months, and shall not be eligible to work without being under the direct supervision of a journeyman plumber until such time as they have passed the journeyman plumbers examination.

(8) Specialty plumber trainee. A specialty trainee shall have completed four thousand five hundred hours of training under the direct supervision of a certified specialty or journeyman plumber to be eligible to take the specialty plumbers examination. A trainee who has failed the examination may not be eligible to retake the examination for six months, and shall be required to work under the direct supervision of a certified plumber until such time as they have passed the specialty plumbers examination.

[Statutory Authority: Chapter 18.106 RCW. 86-19-083 (Order 86-30), § 296-400-120, filed 9/17/86.]

WAC 296-400-130 Penalties for false statements or material misrepresentation. (1) All applications required under chapter 18.106 RCW and the annual statement of hours of employment required under RCW 18.106.070(2) shall be made under oath. A person who knowingly makes a false statement or material misrepresentation on an application or statement or misrepresentation of trainee certificate may be referred to the county prosecutor for criminal prosecution under RCW 9A.72.020, 9A.72.030, and 9A.72.040. The department may also subtract up to one thousand eight hundred hours of employment from a trainee's acceptable total hours, if the department determines the trainee has made a false statement or material misrepresentation.

(2) Decisions of the department under this section are subject to appeal to the advisory board. The hearing shall be conducted in accordance with the provisions of chapter 34.04 RCW.

[Statutory Authority: Chapter 18.106 RCW. 86-19-083 (Order 86-30), § 296-400-130, filed 9/17/86.]

WAC 296-400-140 Enforcement. (1) The department shall ensure that persons subject to chapter 18.106 RCW comply with that chapter by inspecting the job sites. The inspections shall be made by the department's compliance inspectors.

(2) The compliance inspector shall determine whether:

(a) Each person doing plumbing work on the job site has a proper journeyman, specialty, or trainee certificate on their person;

(b) The ratio of the certified journeyman plumbers to the certified trainees on the job site is correct; and

(c) Each certified trainee is directly supervised by an individual with a journeyman or specialty certificate of competency.

(3) If the compliance inspector determines a person has violated chapter 18.106 RCW, the department shall issue a notice of infraction that describes the reason the person has violated chapter 18.106 RCW.

(4) A person wishing to appeal a notice of infraction shall do so by complying to the requirement of RCW 18.106.220.

[Statutory Authority: Chapter 18.106 RCW. 86-19-083 (Order 86-30), § 296-400-140, filed 9/17/86.]

WAC 296-400-300 Procedures for notices of infraction.

(1) The department may issue a notice of infraction to a plumber that violates RCW 18.106.180. The notice of infraction by law must be on the same basic form as that prescribed for traffic infractions. The supreme court has adopted the justice court traffic infraction rules (JTIR) as the rules of procedure for traffic infractions. To ensure that court procedures are the same for plumber notices of infraction as for traffic notices of infraction, the department shall comply with all JTIR rules except for rules 1.1, 1.2, 2.1, and 2.4(a). Rules 1.1, 1.2, and 2.1 do not directly apply to notices of violation for plumbers. Rule 2.4(a) does not apply because RCW 18.106.220 provides that a defendant must respond to a notice of violation within fourteen days, not within seven days as for a traffic infraction.

(2) In reading the JTIR rules, the following terms, as they appear in the rules, shall be construed to mean:

(a) "Department" means the department of labor and industries, not the department of licensing;

(b) "Notice of traffic infraction" means notice of infraction;

(c) "Traffic case" means a plumber infraction case;

(d) "Law enforcement officer" means a representative of the department.

[Statutory Authority: RCW 18.27.040, 18.27.200 and 18.106.020. 84-12-018 (Order 84-08), § 296-400-300, filed 5/25/84.]

Chapter 296-401 WAC

CERTIFICATION OF COMPETENCY FOR JOURNEYMAN ELECTRICIANS

WAC

- 296-401-020 Electricians with licenses or practicing the electrical trade at effective date of the act.
- 296-401-030 Issuing of temporary permits.
- 296-401-060 Specialty certificates.
- 296-401-075 Electrical linemens exemption.

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- 296-401-080 Eligibility for journeyman examination.
- 296-401-085 Eligibility for specialty examination.
- 296-401-087 Partial credit for experience.
- 296-401-090 Status of person who has failed an examination for an electrician certificate of competency.
- 296-401-100 Computation of years of employment—Renewal of training certificates.
- 296-401-110 Previous experience credit.
- 296-401-120 Electrical training certificates.
- 296-401-150 Penalties for false statements or material misrepresentation.
- 296-401-160 Enforcement.
- 296-401-163 Continuing education classes.
- 296-401-165 Issuing and renewing an electrician certificate of competency.
- 296-401-168 Reciprocal electrician certificates.
- 296-401-170 Hearing or appeal procedure.
- 296-401-175 Journeyman, specialty and trainee certificate, and examination fees.
- 296-401-180 Examination subjects for specialty and journeyman certificates of competency.

DISPOSITION OF SECTIONS FORMERLY CODIFIED IN THIS CHAPTER

- 296-401-010 Examination and fees. [Statutory Authority: RCW 19.28.060 and 19.28.210. 82-18-036 (Order 82-29), § 296-401-010, filed 8/26/82; Order 73-21, § 296-401-010, filed 11/5/73.] Repealed by 83-23-053 (Order 83-32), filed 11/14/83. Statutory Authority: RCW 19.28.120 and 19.28.510.
- 296-401-040 Requirements for an apprentice permit. [Order 74-12, § 296-401-040, filed 4/15/74; Order 73-21, § 296-401-040, filed 11/5/73.] Repealed by Order 75-26, filed 8/4/75.
- 296-401-050 Meetings of governor's advisory board. [Order 73-21, § 296-401-050, filed 11/5/73.] Repealed by 81-06-037 (Order 81-5), filed 2/27/81, effective 4/1/81. Statutory Authority: RCW 19.28.060.
- 296-401-070 Eligibility for specialty examination. [Statutory Authority: RCW 18.37.130. 80-02-052 (Order 80-1), § 296-401-070, filed 1/16/80.] Repealed by 83-23-053 (Order 83-32), filed 11/14/83. Statutory Authority: RCW 19.28.120 and 19.28.510.
- 296-401-130 Annual renewal of electrical journeyman, specialty, and trainee certificates. [Statutory Authority: RCW 19.28.600. 83-12-021 (Order 83-14), § 296-401-130, filed 5/25/83. Statutory Authority: RCW 18.37.130. 80-02-052 (Order 80-1), § 296-401-130, filed 1/16/80.] Repealed by 83-23-053 (Order 83-32), filed 11/14/83. Statutory Authority: RCW 19.28.120 and 19.28.510.
- 296-401-140 Supervision of trainees in the electrical trades. [Statutory Authority: RCW 19.28.060. 81-06-037 (Order 81-5), § 296-401-140, filed 2/27/81, effective 4/1/81. Statutory Authority: RCW 18.37.130. 80-02-052 (Order 80-1), § 296-401-140, filed 1/16/80.] Repealed by 83-23-053 (Order 83-32), filed 11/14/83. Statutory Authority: RCW 19.28.120 and 19.28.510.

WAC 296-401-020 Electricians with licenses or practicing the electrical trade at effective date of the act.

Any application for certification under RCW 19.28.560 of this act must be received by the department prior to December 14, 1973. As defined in RCW 19.28.530 an applicant to be certified as a journeyman electrician must have had four or more years of experience under the direct supervision of a licensed journeyman electrician.

[Statutory Authority: RCW 19.28.060. 81-06-037 (Order 81-5), § 296-401-020, filed 2/27/81, effective 4/1/81; Order 76-3, § 296-401-020, filed 1/30/76; Order 73-21, § 296-401-020, filed 11/5/73.]

WAC 296-401-030 Issuing of temporary permits.

(1) The department will issue to an applicant who meets the

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eligibility requirements of RCW 19.28.530, one out-of-state temporary permit during the period of time between filing an application to take the next certification examination and the date the results of the examination are furnished to the applicant.

If the applicant with a temporary permit does not appear for the examination the applicant has been scheduled for, the permit will expire on the expiration date specified on the permit.

(2) The department will issue a second temporary certificate of competency to an applicant for a period of ninety days or less only if the applicant furnishes evidence to the department of enrollment in an electrician training or refresher course which has been approved by the electrical board.

[Statutory Authority: RCW 19.28.060, 88-16-002 (Order 88-15), § 296-401-030, filed 7/21/88. Statutory Authority: RCW 19.28.060, 19.28.600 and chapter 19.28 RCW, 86-18-041 (Order 86-23), § 296-401-030, filed 8/29/86. Statutory Authority: RCW 19.28.120 and 19.28.510, 83-23-053 (Order 83-32), § 296-401-030, filed 11/14/83; Order 74-12, § 296-401-030, filed 4/15/74; Order 73-21, § 296-401-030, filed 11/5/73.]

WAC 296-401-060 Specialty certificates. The department shall issue specialty electrician's certificates of competency in the following areas of electrical work:

(1) Residential (02). The holder of a residential certificate is limited to wiring one-family and two-family dwellings, or multifamily dwellings that do not exceed three floors above grade. All wiring shall be in nonmetallic sheathed cable, except service and feeder wiring. This specialty does not include wiring commercial occupancies such as motels, hotels, offices, or stores.

(2) Pump and irrigation (03). The holder is limited to the electrical connection of domestic and irrigation water pumps, circular irrigating systems, and related pumps and pump houses. The holder may also install the circuits, feeders, controls, and services necessary to supply electricity to the pumps.

(3) Signs (04). The holder is limited to; placing and connecting signs and outline lighting and their electrical supply, controls, and associated circuit extensions; and the installation of a maximum 60 ampere, 120/240 volt, single phase service to supply power to a remote sign only.

(4) Domestic appliances (05). The holder is limited to the electrical connection of domestic appliances and their wiring, such as hot water heaters, ranges, dishwashers, clothes dryers, oil and gas furnaces, and similar appliances. The holder may also install the circuits to domestic appliances but may not install service or feeder wires, or circuits to electric furnaces and heat pump equipment.

(5) Limited energy system (06). The holder is limited to installing signaling circuits, power limited circuits, and related equipment. Such equipment includes fire protection signaling systems, intrusion alarms, nonutility-owned communication systems, and similar low energy circuits and equipment.

(6) Nonresidential maintenance (07). The holder is limited to maintaining, repairing and replacing electrical equipment and conductors on industrial or commercial premises. This specialty certificate does not include maintenance activities in hotel, motel or dwelling units.

[Statutory Authority: RCW 19.28.060, 19.28.600 and chapter 19.28 RCW, 86-18-041 (Order 86-23), § 296-401-060, filed 8/29/86. Statutory Authority: RCW 19.28.120 and 19.28.510, 83-23-053 (Order 83-32), § 296-401-060, filed 11/14/83. Statutory Authority: RCW 18.37.130, 80-02-052 (Order 80-1), § 296-401-060, filed 1/16/80.]

WAC 296-401-075 Electrical linemens exemption. No journeyman electrician certificate or electrical trainee certificate shall be required of employees of serving electrical utilities or of employees of electrical contractors licensed under RCW 19.28.120 for performing work found in WAC 296-46-935 when:

(1) The employees have graduated from an approved lineman's apprenticeship course approved by the department of labor and industries; or

(2) The employees are presently registered in a department of labor and industries approved lineman's apprenticeship course and are under the direct supervision of a certified journeyman electrician; or an employee having met the requirements of subsection (1) of this section; and

(3) The employees carry on their person, acceptable evidence that the requirements of subsection (1) or (2) of this section have been complied with; and

(4) The training received in the approved apprenticeship course includes training in the applicable articles of the currently adopted edition of the National Electrical Code as determined by the department.

[Statutory Authority: RCW 19.28.600, 93-03-048, § 296-401-075, filed 1/15/93, effective 2/15/93.]

WAC 296-401-080 Eligibility for journeyman examination. A person holding an electrical training certificate who has: (1) Been employed under the direct supervision of a journeyman electrician for four years, or (2) has completed a four year apprenticeship program in the electrical construction trade that is registered with the state apprenticeship council or the Federal Bureau of Apprenticeship and Training, or (3) is a graduate of a trade school program in the electrical construction trade that was established during 1946, shall be eligible to take the examination for a journeyman certificate of competency. A person who has had two years of schooling under the conditions provided in RCW 19.28.530 in addition to two years of employment under the direct supervision of a journeyman electrician shall be eligible to take the examination for a journeyman certificate of competency.

[Statutory Authority: RCW 19.28.060, 88-16-002 (Order 88-15), § 296-401-080, filed 7/21/88. Statutory Authority: RCW 19.28.060, 19.28.600 and chapter 19.28 RCW, 86-18-041 (Order 86-23), § 296-401-080, filed 8/29/86. Statutory Authority: RCW 19.28.060, 81-06-037 (Order 81-5), § 296-401-080, filed 2/27/81, effective 4/1/81. Statutory Authority: RCW 18.37.130, 80-02-052 (Order 80-1), § 296-401-080, filed 1/16/80.]

WAC 296-401-085 Eligibility for specialty examination. A person holding an electrical trainee certificate who has: (1) Been employed in the appropriate specialty under the direct supervision of a journeyman electrician or an appropriate specialty electrician for a minimum of two years, or (2) has completed a two year apprenticeship program in the electrical construction trade that is registered with the state apprenticeship council or the Federal Bureau of Apprenticeship and Training in the appropriate specialty,

shall be eligible to take the examination for a specialty electrician certificate of competency.

[Statutory Authority: RCW 19.28.060. 88-16-002 (Order 88-15), § 296-401-085, filed 7/21/88.]

WAC 296-401-087 Partial credit for experience. (1)

A person holding a journeyman electrician certificate in a country outside the United States of America that requires at least four years of training shall be granted two years credit toward a journeyman certificate. An additional two years training under the direct supervision of a journeyman electrician is necessary to qualify to take the journeyman electrician certificate of competency examination.

(2) A person who has two years or more training or experience in a specialized electrical field in the Armed Forces of the United States that is similar to, but not identical to, a specialty electrician category under WAC 296-401-060 shall be granted one year experience. An additional year of work experience in the appropriate specialty under the direct supervision of a journeyman or specialty electrician is necessary to qualify to take a specialty examination.

[Statutory Authority: RCW 19.28.060. 88-16-002 (Order 88-15), § 296-401-087, filed 7/21/88.]

WAC 296-401-090 Status of person who has failed an examination for an electrician certificate of competency. (1)

A person who fails an examination for an electrician certificate of competency may take a training or refresher course that has been approved by the electrical board and may work in the electrical construction trade only if the person has a valid electrician training certificate or temporary permit. A person is eligible to retake an examination upon application and payment of applicable fees only upon satisfactory completion of an approved electrician training or refresher course.

(2) A person who has a training certificate and/or who is taking a refresher course shall work only under the supervision of a certificated electrician.

(3) Upon application, the department may issue an electrician training certificate to a person who has failed an examination for a certificate of competency, only if the person furnishes evidence of enrollment in an electrician training or refresher course which is approved by the electrical board. To be eligible to renew the training certificate, the person must furnish evidence of, (a) successfully completing the electrician training or refresher course, and (b) failing the certificate of competency again.

[Statutory Authority: RCW 19.28.060. 88-16-002 (Order 88-15), § 296-401-090, filed 7/21/88. Statutory Authority: RCW 19.28.060, 19.28.600 and chapter 19.28 RCW. 86-18-041 (Order 86-23), § 296-401-090, filed 8/29/86. Statutory Authority: RCW 18.37.130. 80-02-052 (Order 80-1), § 296-401-090, filed 1/16/80.]

WAC 296-401-100 Computation of years of employment—Renewal of training certificates. (1) For the purposes of RCW 19.28.530, 1800 hours of employment shall be considered one year of employment.

(2) At the time of renewal of an electrical training certificate, the holder shall provide the department with an accurate list of the holder's employers in the electrical industry for the previous year, the specialty the holder

worked in and the number of hours worked for each employer in each specialty.

(3) The employer or apprenticeship program director shall upon request by the holder of the training certificate furnish an accurate list of the hours worked by the holder within twenty days of the request.

(4) A person who has completed a four year apprenticeship program in the electrical construction trade that is registered with the state apprenticeship council or the Federal Bureau of Apprenticeship and Training shall be considered to have completed 7200 hours (four years) of employment.

[Statutory Authority: RCW 19.28.060. 88-16-002 (Order 88-15), § 296-401-100, filed 7/21/88. Statutory Authority: RCW 19.28.060, 19.28.600 and chapter 19.28 RCW. 86-18-041 (Order 86-23), § 296-401-100, filed 8/29/86. Statutory Authority: RCW 19.28.060. 81-06-037 (Order 81-5), § 296-401-100, filed 2/27/81, effective 4/1/81. Statutory Authority: RCW 18.37.130. 80-02-052 (Order 80-1), § 296-401-100, filed 1/16/80.]

WAC 296-401-110 Previous experience credit. A person who is applying for an electrical trainee certificate who has already worked in electrical construction before September 1, 1979 shall receive credit for all electrical work previously performed toward the hours required for the examination.

[Statutory Authority: RCW 18.37.130. 80-02-052 (Order 80-1), § 296-401-110, filed 1/16/80.]

WAC 296-401-120 Electrical training certificates.

(1) The department upon proper application and verification shall issue separate electrical training certificates for the first, second, third, and fourth years of training. If a person has 1800 hours of employment or less in the electrical construction trade, the department shall issue the individual a first year certificate; if more than 1800 through 3600 hours, a second year certificate; if more than 3600 through 5400 hours, a third year certificate; and if more than 5400 hours a fourth year certificate.

(2) A holder of an electrical training certificate may apply for the next year's certificate whenever he or she has sufficient hours of employment.

(3) A holder of an electrical training certificate may apply for authorization to work without supervision if he or she has over 6299 hours of employment, and has successfully completed or is currently enrolled in an approved apprenticeship program or in a technical school program in the electrical construction trade in a school approved by the superintendent of public instruction.

(4) The department shall not issue an electrical training certificate to a person who is eligible for a temporary or reciprocal electrician certificate of competency.

[Statutory Authority: RCW 19.28.060. 88-16-002 (Order 88-15), § 296-401-120, filed 7/21/88. Statutory Authority: RCW 19.28.060, 19.28.600 and chapter 19.28 RCW. 86-18-041 (Order 86-23), § 296-401-120, filed 8/29/86. Statutory Authority: RCW 18.37.130. 80-02-052 (Order 80-1), § 296-401-120, filed 1/16/80.]

WAC 296-401-150 Penalties for false statements or material misrepresentation. All applications required under chapter 19.28 RCW and the annual statement of hours of employment required under RCW 19.28.510, shall be made under oath. A person who knowingly makes a false statement or material misrepresentation on an application or

statement may be referred to the county prosecutor for criminal prosecution under RCW 9A.72.020, 9A.72.030, and 9A.72.040. The department may also file a civil action under RCW 19.28.620 and may subtract up to 900 hours of employment from a trainee's total hours, if the department determines the trainee has made a false statement or material misrepresentation.

[Statutory Authority: RCW 19.28.060, 81-06-037 (Order 81-5), § 296-401-150, filed 2/27/81, effective 4/1/81. Statutory Authority: RCW 18.37.130, 80-02-052 (Order 80-1), § 296-401-150, filed 1/16/80.]

WAC 296-401-160 Enforcement. (1) The department shall ensure that employers and employees subject to chapter 19.28 RCW comply with that chapter and chapter 296-401 WAC by inspecting electrical job sites. The inspections shall be made by the department's compliance officers, or electrical inspectors.

(2) The compliance officer or electrical inspector shall determine whether:

(a) Each person doing electrical work on the job site has a proper journeyman, specialty, or trainee certificate;

(b) The ratio of the certified journeyman electricians to the certified trainees on the job site is correct; and

(c) Each certified trainee is directly supervised by an individual with a journeyman or proper specialty certificate of competency for the type of electrical work being performed.

(3) If the compliance officer or electrical inspector determines that an employer or employee has violated chapter 19.28 RCW or chapter 296-401 WAC, the department shall issue a citation that describes the reason the employer or employee has violated chapter 19.28 RCW or chapter 296-401 WAC. If an employer or employee continues to violate chapter 19.28 RCW or chapter 296-401 WAC, the department electrical inspectors or compliance officers may issue a cease and desist order.

(4) The employer or employee to whom a citation or cease and desist order is directed may request a hearing pursuant to RCW 19.28.620; however, the request shall not stay the effect of the citation or cease and desist order. If the employer or employee disobeys the cease and desist order, the department shall apply to the superior court for a court order enforcing the cease and desist order. If the employer or employee disobeys the court order, the department shall request the attorney general to apply to the superior court for an order holding the employer or employee in contempt of court.

[Statutory Authority: RCW 19.28.060, 19.28.600 and chapter 19.28 RCW, 86-18-041 (Order 86-23), § 296-401-160, filed 8/29/86. Statutory Authority: RCW 19.28.120 and 19.28.510, 83-23-053 (Order 83-32), § 296-401-160, filed 11/14/83. Statutory Authority: RCW 19.28.060, 81-06-037 (Order 81-5), § 296-401-160, filed 2/27/81, effective 4/1/81. Statutory Authority: RCW 18.37.130, 80-02-052 (Order 80-1), § 296-401-160, filed 1/16/80.]

WAC 296-401-163 Continuing education classes.

(1) Each continuing education class, course, or seminar for renewal of an electrician's certificate of competency must be approved by a subcommittee of the electrical board. The subcommittee will consist of three board members with the chief electrical inspector as an ex-officio member. The action of the subcommittee will be reported and ratified at

the next regularly scheduled board meeting. Class, course, or seminar hours completed prior to approval of the class, course, or seminar by the subcommittee will not be accepted.

(2) Each continuing education class, course, or seminar application submitted for subcommittee approval must:

(a) Be submitted on forms furnished by the department.

(b) The forms furnished by the department will require the following:

(i) Name of class, course, or seminar and a general description and course outline of the program, and list of all text and related materials, including hours to be earned and hours of classroom instruction.

(ii) Name and address of program sponsor including a contact person.

(iii) Names of instructors and qualifications.

(iv) Copy of completion certificate or copy of the continuing education form developed by the department which lists:

(A) Attendee's name, address, and Social Security number.

(B) Class number, location, and date of class.

(C) Instructor's name and signature or notarized signature of sponsor.

(c) Consist of not less than four classroom hours of instruction; be open to monitoring by a representative of the department and/or the electrical board at no charge.

(d) Award a certificate or continuing education form, to those completing the class, course, or seminar for submittal to the department accompanying the electrician's renewal application.

(e) In order to be considered for approval, course offerings must be based upon:

(i) Currently adopted edition of the National Electrical Code; and/or

(ii) Currently adopted WAC rules, chapters 296-46 and 296-401 WAC; or

(iii) Materials and methods as they pertain to electrical construction, building management systems, and electrical maintenance.

(3) Application for approval of continuing education classes, courses, or seminars must be received by the department not less than forty-five days prior to the proposed first offering of the class, course, or seminar.

(4) Approval of classes, courses, or seminars will be for a period not to exceed three years and when code related must be resubmitted for approval upon adoption of a new National Electrical Code edition.

(5) All class, course, or seminar approval considered will be reviewed without testimony and will be considered on submitted information only. The applicant will be notified within five days of the review of acceptance or with specific written explanation as to why, the applicant's submittal has been rejected.

(6) Applicants wishing to appeal a decision by the subcommittee must do so not less than forty-five days prior to a regularly scheduled electrical board meeting and must furnish any additional information, for submittal to the electrical board not less than thirty days prior to the electrical board meeting scheduled to hear the appeal.

(7) Acceptable evidence of completion of a continuing education class, course, or seminar shall be a copy of the completion certificate required in subsection (2)(d) of this

section. The department will not keep the submitted copies of the completion certificate on file after renewal of an applicant's certificate. The department will not accept, nor be responsible for, the original of any completion certificate issued under this section.

[Statutory Authority: RCW 19.28.065 and 19.28.550. 94-01-005, § 296-401-163, filed 12/1/93, effective 1/1/94.]

WAC 296-401-165 Issuing and renewing an electrician certificate of competency. (1) The department shall issue an electrician certificate of competency to journeyman or specialty electricians who meet the qualifications in RCW 19.28.530 and who have successfully passed a certification examination in accordance with RCW 19.28.540.

(2) The electrician certificate of competency shall expire on the dates identified in subsection (4) of this section. All subsequent certificates shall be issued for a three-year period. The department shall prorate the original electrician certification fee according to the number of months or major part of a month in a certificate period.

(3) An individual who successfully passes an examination for a certificate of competency, shall apply for a certificate of competency within thirty days of the date the person is notified about the results of the examination. A person who does not apply for a certificate of competency within thirty days of the date the person is notified about the results of the examination, shall be required to apply for, take and pass the examination again.

(4)(a) The certificate of electricians whose last name begins with the letters A through K will expire on April 30.

(b) The certificate of electricians whose last name begins with the letters L through Z will expire on October 31.

(c) The expiration of the certificate identified in (a) and (b) of this subsection shall be not less than six months nor more than three years from the original date of issuance.

(5)(a) Beginning April 30, 1997, to renew an electrician certificate of competency the holder must, prior to the expiration date of the certificate, remit the appropriate fee identified in WAC 296-401-175 and provide to the department evidence of the completion of approved continuing education course(s) of at least eight classroom hours duration per year of the prior certification period.

(b) An electrician certificate will be renewed within ninety days after the expiration date without reexamination, if the applicant furnishes to the department evidence of completion of approved continuing education course(s) of at least eight classroom hours duration per year of the prior certification, by payment of double the fee identified in WAC 296-401-175. All applications for renewal received more than ninety days after the expiration date of the certificate will require passage of the examination provided by RCW 19.28.540 for recertification.

(c) An electrician certificate will be renewed but will be placed in an inactive status if the renewal process concerning the remittance of application and proper fees complies with (a) or (b) of this subsection but the applicant has not completed the required hours of continuing education course(s). Persons holding a certificate placed in an inactive status will not be permitted to engage in the electrical construction trade. Certificates placed in an inactive status

will be returned to active status upon presentation to the department of evidence that all classroom hours of continuing education that were required for renewal have been completed.

(d) Each application for renewal of a prior certification that covered a period of two years or more must include evidence of attendance at an approved continuing education class, of at least eight classroom hours duration, on the latest National Electrical Code changes.

[Statutory Authority: RCW 19.28.550. 94-01-005, § 296-401-165, filed 12/1/93, effective 1/1/94. Statutory Authority: RCW 19.28.060, 19.28.600 and chapter 19.28 RCW. 86-18-041 (Order 86-23), § 296-401-165, filed 8/29/86. Statutory Authority: RCW 19.28.120 and 19.28.510. 83-23-053 (Order 83-32), § 296-401-165, filed 11/14/83.]

WAC 296-401-168 Reciprocal electrician certificates. The department shall issue a reciprocal electrician certificate to an electrician coming into the state of Washington from another state who meets the eligibility requirement in RCW 19.28.530 in accordance with the following conditions:

(1) The department has a valid reciprocal agreement with another state in the journeyman or specialty category requested.

(2) The application shall be made on forms prescribed by the department.

(3) The person shall furnish evidence that he or she meets the eligibility requirements in RCW 19.28.530.

(4) The applicant shall pay a fee with the application which shall equal the electrician certification examination application fee and the certificate fee as determined in accordance with chapter 296-401 WAC.

(5) The applicant must have obtained a certificate of competency for which reciprocity is requested while a resident of another state.

(6) A person is not eligible for a reciprocal electrician certificate who has taken an examination to obtain a certificate of competency in the state of Washington, who has failed an examination for a certificate of competency in the state of Washington or who has failed to renew a certificate of competency in accordance with chapter 19.28 RCW.

[Statutory Authority: RCW 19.28.060, 19.28.600 and chapter 19.28 RCW. 86-18-041 (Order 86-23), § 296-401-168, filed 8/29/86.]

WAC 296-401-170 Hearing or appeal procedure.

(1) An employer or employee to whom a citation or cease and desist order is directed; a person who is aggrieved by the department's suspension or revocation of a trainee, journeyman, or specialty certificate; or the denying an application to take an examination for a certificate; or a person who has had his or her hours reduced pursuant to WAC 296-401-150; may request a formal or informal hearing before the electrical board within fifteen days from receipt of the citation, cease and desist order, the suspension or revocation of a certificate, denial of an application, or the reduction of hours.

(2) The formal appeal shall be made in writing to the department chief electrical inspector and shall state the action by the department that is being appealed and the relief that is desired and shall be accompanied by a certified check in the amount of two hundred dollars made payable to the department. The deposit shall be returned to the aggrieved

party if the decision of the department is not sustained or upheld. If the decision of the department is sustained or upheld, the deposit shall be used to pay the expenses of holding the hearing and any balance remaining after payment of the hearing expenses shall be paid into the electrical license fund. The formal appeal shall be assigned to an administrative law judge and shall be held in conformance with the requirements of the Administrative Procedure Act, chapter 34.04 RCW. Findings of fact, conclusions of law, and a decision are given as a result of a formal appeal.

(3) The electrical board will hear informal appeals from persons who desire to contest a decision of the department. Informal appeals will be heard by the board at a regular or special board meeting. An informal appeal shall be made in writing to the department chief electrical inspector and shall state the action by the department that is being appealed and the relief that is desired. An informal decision is given as a result of an informal appeal.

(4) See chapter 296-13 WAC for additional information on appeals before the electrical board.

[Statutory Authority: RCW 19.28.060, 88-16-002 (Order 88-15), § 296-401-170, filed 7/21/88. Statutory Authority: RCW 19.28.060, 19.28.600 and chapter 19.28 RCW, 86-18-041 (Order 86-23), § 296-401-170, filed 8/29/86. Statutory Authority: RCW 18.37.130, 80-02-052 (Order 80-1), § 296-401-170, filed 1/16/80.]

WAC 296-401-175 Journeyman, specialty and trainee certificate, and examination fees.

- (1) Journeyman or specialty electrician certificate renewal (per 36-month period) - \$ 60
- (2) Late renewal of journeyman or specialty electrician certificate (per 36-month period) - \$120
- (3) Journeyman or specialty electrician examination application (nonrefundable) - \$ 25
- (4) Journeyman or specialty electrician original certificate [(submitted with application)] - \$ 40
- (5) Trainee certificate (expires one year after purchase) - \$ 20
- (6) Trainee certificate renewal or update of hours - \$ 20
- (7) Journeyman or specialty electrician test or retest fee - \$ 45

[Statutory Authority: Chapter 19.28 RCW (RCW 19.28.060, [19.28].550, [19.28].600), 95-15-034, § 296-401-175, filed 7/12/95, effective 8/14/95. Statutory Authority: RCW 19.28.060, 19.28.010(1), 19.28.600, 19.28.510(2), 19.28.540(2) and 19.28.550, 92-09-010, § 296-401-175, filed 4/2/92, effective 5/3/92. Statutory Authority: RCW 19.28.060, 19.28.600, 19.28.510(2), 19.28.540(2) and 19.28.550, 90-17-041, § 296-401-175, filed 8/10/90, effective 9/10/90. Statutory Authority: RCW 19.28.060, 19.28.600 and chapter 19.28 RCW, 86-18-041 (Order 86-23), § 296-401-175, filed 8/29/86. Statutory Authority: RCW 19.28.060 and 19.28.210, 85-20-065 (Order 85-16), § 296-401-175, filed 9/27/85. Statutory Authority: RCW 19.28.120 and 19.28.510, 83-23-053 (Order 83-32), § 296-401-175, filed 11/14/83.]

Reviser's note: RCW 34.05.395 requires the use of underlining and deletion marks to indicate amendments to existing rules, and deems ineffectual changes not filed by the agency in this manner. The bracketed material in the above section does not appear to conform to the statutory requirement.

WAC 296-401-180 Examination subjects for specialty and journeyman certificates of competency. The following subjects are among those that may be included in the examination for a certificate of competency. The list is not exclusive, and the test may also contain subjects not in the list.

JOURNEYMAN ELECTRICIAN EXAMINATIONS MAY BE BASED ON THE SUBJECTS FOR SPECIALTY ELECTRICIAN EXAMINATIONS IN ADDITION TO THESE SUBJECTS:

- AC - Generator; three-phase; meters; characteristics of; power in AC circuits (power factor); mathematics of AC circuits
- Air conditioning - Basic
- Blueprints - Surveys and plot plans; floor plans; service and feeders; Electrical symbols; elevation views; plan views
- Building wire - Sizes
- Cable trays
- Calculations
- Capacitive reactance
- Capacitor - Types; in series and parallel
- Circuits - Series; parallel; combination; basic; branch; outside branch circuits; calculations
- Conductor - Voltage drop (line loss); grounded
- Conduit - Wiring methods
- DC - Generator; motors; construction of motors; meters
- Definitions
- Electrical units
- Electron theory
- Fastening devices
- Fire alarms - Introduction to; initiating circuits
- Fuses
- Generation - Principles of
- Grounding
- Incandescent lights
- Inductance - Introduction to; reactance
- Insulation - of wire
- Mathematics - Square root; vectors' figuring percentages
- Motors - Motors vs. Generators/CEMF; single phase; capacitor; repulsion; shaded pole; basic principles of AC motors
- Ohm's Law
- Power
- Power factor - AC circuits; correction of; problems
- Rectifiers
- Resistance - of wire
- Rigging
- Safety - Electrical shock
- Services
- Three-wire system
- Tools
- Transformers - Principles of; types; single phase; three-phase connections
- Voltage polarity across a load
- Wiring methods - Conduit; general

Wiring systems - Less than 600 volts;
480/277 volts; three-phase delta or wye;
distribution systems over 600 volts.

296-402-170 Penalties.
296-402-180 Notification of change.
296-402-190 Revocation and suspension procedures.
296-402-200 Appeal procedures.

SPECIALTY ELECTRICIAN EXAMINATIONS MAY BE BASED ON
THESE SUBJECTS:

- AC - Meters
- Appliance circuits or controls
- Blueprints - Floor plans;
service and feeders
- Cables - Wiring methods
- Calculations
- Circuits - Series; parallel; combination;
basic; outside branch
- Conductor - Voltage drop (line loss); grounded;
Aluminum or copper
- Conduit - Wiring methods
- Electrical signs, circuits, controls, or services
- Electrical units
- First aid
- Fuses
- General lighting
- Grounding of conductors
- Insulation of wire
- Ladder safety
- Limited energy circuits or systems
- Maintenance of electrical systems
- Mathematics - Figuring percentage
- Motor circuits, controls, feeders, or services
- Ohm's Law
- Overcurrent protection
- Resistance of wire
- Services
- Sizes of building wire
- Three-wire system
- Tools
- Transformer - Ratios; single-phase

[Statutory Authority: RCW 19.28.060, 88-16-002 (Order 88-15), § 296-401-180, filed 7/21/88; 81-06-037 (Order 81-5), § 296-401-180, filed 2/27/81, effective 4/1/81. Statutory Authority: RCW 18.37.130, 80-02-052 (Order 80-1), § 296-401-180, filed 1/16/80.]

Chapter 296-402 WAC
ELECTRICAL TESTING LABORATORY
ACCREDITATION

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296-402-160	Conditions of accreditation.

WAC 296-402-010 Foreword. This chapter is promulgated in accordance with the provisions of chapter 19.28 RCW which covers electricians and electrical installations.

To qualify for certification as an approved electrical products testing laboratory, the criteria of this chapter shall be complied with.

[Statutory Authority: RCW 19.28.010, 19.28.060, 19.28.065 and 19.28.070, 85-20-130 (Order 85-27), § 296-402-010, filed 10/2/85.]

WAC 296-402-020 Purpose and scope. The purpose of this chapter is to provide for recognition and accreditation of electrical products testing and certification laboratories for the state of Washington so the general consuming public can be assured that electrical products have been tested for safety and identified for their intended use.

Any electrical product, device, system, material, or installation which is accepted, or classified, identified, or certified, or listed, or labeled by a Washington state accredited electrical products testing laboratory shall be deemed to have been successfully evaluated for safety.

[Statutory Authority: RCW 19.28.010, 19.28.060, 19.28.065 and 19.28.070, 85-20-130 (Order 85-27), § 296-402-020, filed 10/2/85.]

WAC 296-402-030 Definitions. The definitions set forth in this section shall apply throughout this chapter.

(1) "ANSI" means American National Standards Institute.

(2) "Board" means the electrical board established pursuant to RCW 19.28.065. The term "board" also includes an administrative law judge or board member appointed by the board to hear an appeal.

(3) "Certified electrical product" means an electrical product that is certified under this chapter:

(a) To which a label, symbol, or other identifying mark of an approved testing laboratory has been attached to indicate that the manufacturer produced the product in compliance with appropriate standards or that the product performs in a specified manner.

(b) That is not decertified.

(4) "Certification mark" means a specified approved testing laboratory identification indicating that a certified electrical product has been manufactured in accordance with the requirements of appropriate standards or tested for specific end uses.

(5) "Certification program" means a specified set of testing, inspection, and quality assurance procedures, with appropriate implementing authority directed toward evaluating products for certification of compliance to the requirements of appropriate standards.

(6) "Department" means the department of labor and industries.

(7) "Electrical board" means the board established pursuant to RCW 19.28.065. The term "electrical board" also includes an administrative law judge or board member appointed by the board to hear an appeal.

(8) "Labeled" means an electrical product to which a label, symbol, or other identifying mark of an approved laboratory is attached.

(9) "Laboratory operations control manual" means a document consisting of specified procedures and information for each test method responding to the application requirements of the product standard.

(10) "Quality control manual" means a document consisting of general guidelines for the quality control of the laboratory's method of operation. Specific information is provided for portions of individual test methods whenever specifics are needed to comply with the criteria or otherwise support the laboratory's operations.

[Statutory Authority: RCW 19.28.060, 88-16-002 (Order 88-15), § 296-402-030, filed 7/21/88. Statutory Authority: RCW 19.28.010, 19.28.060, 19.28.065 and 19.28.070, 85-20-130 (Order 85-27), § 296-402-030, filed 10/2/85.]

WAC 296-402-040 Organization. The laboratory shall be an independent, third-party testing and inspection organization with no organizational, managerial, or financial affiliation with manufacturers, suppliers, or vendors of products covered under its certification programs.

(1) The laboratory shall not be owned by manufacturers or vendors.

(2) The laboratory administration shall not be controlled by manufacturers or vendors.

(3) The laboratory shall be legally constituted and permitted to perform certification work.

(4) The laboratory shall not be engaged in the promotion or design of the product being evaluated, tested, or certified.

(5) The laboratory shall have sufficient diversity of clients or activity so that the loss or award of a specific contract regarding certification would not be a determinative factor in the financial well-being of the laboratory.

(6) The employment security status of the personnel of the laboratory shall be free of influence or control of manufacturers or vendors of products certified.

[Statutory Authority: RCW 19.28.010, 19.28.060, 19.28.065 and 19.28.070, 85-20-130 (Order 85-27), § 296-402-040, filed 10/2/85.]

WAC 296-402-050 Professional and ethical business practices. The laboratory shall be operated in accordance with generally accepted professional and ethical business practices and shall agree in writing that as a minimum it will be its policy to:

(1) Perform the examinations, tests, evaluations, and inspections required under the certification programs in accordance with the designated standards and procedures.

(2) Assure that reported values accurately reflect measured data.

(3) Limit work to that for which competence and capacity are available.

(4) Treat test data, records, and reports as proprietary information.

(5) Respond and attempt to resolve complaints contesting test results and certifications.

(6) Be capable of performing all examinations, tests, evaluations, and inspections for certification programs for which it is approved according to the latest effective version

of applicable safety standards as adopted by rule, and require that all certified products produced after the effective date comply with such standards.

(7) Maintain an independent relationship between its clients, affiliates, or other organizations, so that the laboratory's capacity to render test reports and certifications objectively and without bias is not adversely affected.

(8) Notify the department within thirty calendar days should it become unable to conform to any of these criteria.

[Statutory Authority: RCW 19.28.010, 19.28.060, 19.28.065 and 19.28.070, 85-20-130 (Order 85-27), § 296-402-050, filed 10/2/85.]

WAC 296-402-060 Quality control system. The laboratory shall maintain a quality control system to help assure the accuracy and technical integrity of its work as follows:

(1) The laboratory's quality control system must include a quality control manual or a laboratory operations control manual containing written procedures and information in response to the applicable requirements of the product standard. The procedures and information may be explicitly contained in the manual or may be referenced so that their location in the laboratory is clearly identified. The written procedures and information must be adequate to guide a testing technician and inspector in conducting the tests and inspections in accordance with the test methods and procedures required for the certification programs for which accreditation is sought.

(2) The laboratory shall have a current copy of its quality control manual available in the laboratory for use by laboratory personnel and shall make the manual available to the department for review and audit.

[Statutory Authority: RCW 19.28.010, 19.28.060, 19.28.065 and 19.28.070, 85-20-130 (Order 85-27), § 296-402-060, filed 10/2/85.]

WAC 296-402-070 Personnel. The laboratory shall be staffed by competent personnel who shall have the necessary education, training, technical knowledge, and experience for their assigned functions to perform the tests, examinations, reevaluations, and inspections for certification programs for which accreditation is sought.

(1) There shall be a job description for each senior technical position category.

(2) The laboratory shall assure the competency of its staff through the observation and/or examination of each relevant staff member in the performance of tests, examinations, and inspections that each member is assigned to perform. The observations must be conducted at intervals not exceeding one year by one or more individuals judged qualified by the person who has technical responsibility for the operation.

(3) The laboratory shall make available the description of its training program for assuring that new or untrained staff will be able to perform tests and inspections properly and uniformly to the requisite degree of precision and accuracy.

(4) The laboratory shall maintain records, including dates of the observation or examination of performance of personnel. Information on the relevant qualifications, training, and experience of the technical staff shall be

maintained by the laboratory and shall be furnished to the department on request.

[Statutory Authority: RCW 19.28.010, 19.28.060, 19.28.065 and 19.28.070, 85-20-130 (Order 85-27), § 296-402-070, filed 10/2/85.]

WAC 296-402-080 Calibration—Verification and maintenance of facilities and equipment. The laboratory shall provide evidence of the calibration, verification, and maintenance of the facilities and equipment specified for each test method for certification programs for which accreditation is sought by means of the following:

(1) A description of the procedures used in calibrating, verifying, and maintaining the test equipment and facilities, including as applicable:

(a) Calibration and verification equipment or services used;

(b) Reference standards and materials used;

(c) Measurement assurance, corroborative reference, or other programs in which the laboratory participates; and

(d) Specified maintenance practices.

(2) Calibration and verification records, including as applicable:

(a) Equipment description or name;

(b) Name of manufacturer;

(c) Model, style, and serial number, or other identification;

(d) Equipment variables subject to calibration and verification;

(e) Statement of the instrument's allowable error and tolerances of readings;

(f) Calibration or verification schedule (intervals);

(g) Dates and results of last calibrations or verifications and schedule of future calibrations or verifications;

(h) Name of laboratory person or outside contractor providing the calibration or verification services; and

(i) Traceability to National Bureau of Standards or other standard reference authority as required.

[Statutory Authority: RCW 19.28.010, 19.28.060, 19.28.065 and 19.28.070, 85-20-130 (Order 85-27), § 296-402-080, filed 10/2/85.]

WAC 296-402-090 Plans for certification programs. The laboratory shall maintain plans for its certification programs for which accreditation is sought which shall include, as applicable, instructions for:

(1) Equipment maintenance and verification checks.

(2) Sample selection.

(3) Data collection, analysis, and reporting.

(4) Quality control checks and audits.

[Statutory Authority: RCW 19.28.010, 19.28.060, 19.28.065 and 19.28.070, 85-20-130 (Order 85-27), § 296-402-090, filed 10/2/85.]

WAC 296-402-100 Records. The laboratory shall maintain records and prepare reports of those testing, inspection, and certification activities associated with each program for which approval is sought. The laboratory shall make available to the department, upon request, a typical completed test or inspection report with the name of the client and source of any product deleted. Test and inspection reports shall contain, as applicable:

(1) Name and address of the laboratory.

(2) Pertinent data and identification of tests or inspections.

(3) Name of client.

(4) Description and identification of the sample including, as necessary, where and how the sample was selected.

(5) An appropriate title.

(6) Identification of the test, inspection, or procedure as specified for the certification program.

(7) Known deviations, additions to, or exclusions from testing, inspection, and certification activities in order to be appropriate to new or innovative products not contemplated by the standard.

(8) Measurements, examinations, derived results, and identification of test anomalies.

(9) If necessary, a statement as to whether or not the results comply with the requirements of the standard.

(10) Signature of person(s) having responsibility for the report.

(11) Data generated during testing if not included in the test report, such as raw data, calculations, tables, graphs, sketches, and photographs, shall be maintained.

(12) Sample control forms documenting the receipt, handling, storage, shipping, and testing of samples or a written description of the procedures and separate records that are maintained to control these operations.

(13) The laboratory shall have copies of applicable standards and other documents referred to or used in performing each test or inspection for product certification for which approval is sought.

(14) The laboratory shall maintain records of its quality control checks and audits for monitoring its test work associated with its certification programs, including:

(a) Records of products assurance (follow-up) test results; and

(b) Records of detected errors and discrepancies and actions taken subsequent to such detection.

(15) The laboratory shall maintain a record of written complaints and disposition thereof.

(16) The laboratory shall retain records required by these criteria for a minimum of three years.

[Statutory Authority: RCW 19.28.010, 19.28.060, 19.28.065 and 19.28.070, 85-20-130 (Order 85-27), § 296-402-100, filed 10/2/85.]

WAC 296-402-110 Product certification program. (1) General. The testing laboratory shall be approved only to certify those products identified by the laboratory in its application and as authorized by the department. The certification program shall contain the procedures and authority to ensure that the certified product complies with the standards (requirements) established by the program.

(2) Electrical product safety standard used. The standard used as the basis of the certification program shall be a state approved product safety standard that is determined to provide an adequate level of safety or define an adequate level of safety performance.

(a) Generally, such standards shall:

(i) Be recognized in the United States as an electrical product safety standard.

(ii) Be compatible with and be maintained current with periodic revisions of applicable national codes and installation standards.

(iii) Be developed by a standards developing organization under a method providing for input and consideration of views of industry groups, experts, users, consumers, and governmental authorities, and others having broad experience in the electrical products safety field.

(b) All ANSI safety designated electrical product standards are deemed acceptable without further qualification.

(c) If a testing laboratory desires to use a published standard other than an ANSI standard, the department shall evaluate the proposed standard to determine that it provides an adequate level of safety. If there exists an ANSI standard, or other published standard meeting the criteria of (a) of this subsection which has been recognized by the department for use in certification programs, the laboratory shall identify and justify all differences between the proposed standard and such ANSI standard or other standard previously recognized by the department.

(d) Where there is no published standard meeting the above cited criteria for the equipment under consideration, the department shall evaluate the proposed standard to determine that it provides an adequate level of safety. The laboratory shall identify and justify the adequacy of the standard or other specifications used as a source of requirements.

(e) The department shall review proposed standards to determine that they provide an adequate level of safety and shall present a recommendation concerning each proposed standard to the electrical advisory board at a regular or special board meeting for the board's approval.

(3) Evaluation of components. Components of certified products shall be evaluated for compliance with standards applicable to such components or found to be suitable for use in the product as stated in the end product standard.

(4) Certification agreement. Measures, such as the following, to provide for manufacturer compliance with the provisions of the product standard and laboratory control of the use of the certification mark shall be embodied in an agreement between the manufacturer and the testing laboratory:

(a) Require the manufacturer to provide such information and assistance as needed by the testing laboratory to conduct the necessary product conformity and production assurance evaluation.

(b) Require the manufacturer to provide the testing laboratory's representative access during working hours to the factory for inspection and audit activities without prior notice.

(c) Restrict the manufacturer to application of certification marks only to products that comply with requirements of the product standard.

(d) Secure the manufacturer's agreement to the publication of notice by the testing laboratory for any product already available in the marketplace that does not meet the safety standard.

(e) Whenever the standard covering the product is revised, require reevaluation of products as a condition of continued use of the certification mark.

(f) Provide for notification by the laboratory of the manufacturer's personnel responsible for and authorized to institute product recall in the case of a hazard.

(g) Provide for control of certification marks (or labels) by the testing laboratory.

(h) Require that the testing laboratory provide to the manufacturer a report of original product evaluation, which documents by test results and other data, when conformity with the applicable product standard is achieved.

(i) Require the manufacturer to provide the identification of the manufacturer or vendor of the product, and, if the product is produced in more than one location, the place of manufacture of the product.

(5) Identification of certified products. Certified products shall be labeled or marked with the certification mark of the approved testing laboratory. The certification mark shall:

(a) Be owned by the testing laboratory and be registered as a certification mark with the United States Patent and Trademark Office.

(b) Not be readily transferable from one product to another.

(c) Be directly applied to each unit of production in the form of labels or markings suitable for the environment and use of the product, except where the physical size of the unit does not permit, in which case markings may then be attached to the smallest package in which the unit is marketed.

(d) Include the name or other appropriate identification of the testing laboratory.

(e) Include the product category where such is not completely obvious.

(6) Directory (list) of certified products. The testing laboratory shall publish annually a products directory to identify products that are authorized to bear the laboratory's certification mark (label). The products directory shall briefly describe the program, the products covered, the name of the manufacturer or vendor of the certified products, and the identification of the published standards or the compiled requirements on which the program is based. The products directory shall be available to the public. Supplemental up-to-date information shall be publicly available at the office of the testing laboratory at any time during normal business hours.

(7) Original conformance (engineering) evaluation. Prior to authorizing the use of a certification mark on a product, the testing laboratory shall:

(a) Determine by examination and/or tests that representative samples of the product comply with the requirements (standards). Components of certified products shall also be required to comply with the safety standards (requirements) applicable to such components or found to be suitable for use as stated in the end product standard. Evaluation of the product design shall be made on representative production samples or on prototype product samples with subsequent verification that factory productions are the same as the prototype.

(b) Determine that the manufacturer has the necessary facilities, test equipment, and control procedures to ensure that continuing production of the product complies with the requirements.

[Statutory Authority: RCW 19.28.010, 19.28.060, 19.28.065 and 19.28.070, 85-20-130 (Order 85-27), § 296-402-110, filed 10/2/85.]

WAC 296-402-120 Product assurance (follow-up) activities. (1) General. Concurrent with and subsequent to authorizing the manufacturer to use the testing laboratory's certification mark, the testing laboratory shall establish a factory follow-up inspection program to determine continued compliance of certified products with the applicable standard.

(2) Follow-up inspection manual. The testing laboratory shall prepare and utilize an inspection manual setting forth the conditions governing the use of the certification mark on the products. The inspection manual shall include the identification of the products authorized for certification; identification of manufacturer and plant location at which manufacture and certification are authorized; description, specifications, and requirements applicable to the product; description of processes where needed for control purposes; description of the manufacturer's quality assurance program when used as part of the follow-up program; description of inspections and tests to be conducted by the manufacturer and the inspector; description of countercheck tests to be conducted in the laboratory; and description of the form and means of applying the certification mark.

(3) Follow-up procedures and activities. Follow-up procedures and activities shall include the following:

(a) Periodic unannounced inspections at the factory with testing at the factory or testing laboratory of representative samples selected from production and, if appropriate, from the market.

(b) Periodic auditing or surveillance of the manufacturer's quality assurance program through the witnessing of manufacturer's tests, review of the manufacturer's records, and verification of the manufacturer's produced data.

(c) Investigation of alleged field failures upon department request.

(d) Procedures for control of the use of the certification mark by:

(i) Keeping records of the release and use of certification marks.

(ii) Removal of marks from noncomplying products.

(iii) Return or destruction of unused marks when the authority to use the marks is terminated.

(iv) Legal action.

(e) Frequency of follow-up. The frequency of follow-up inspections shall be sufficient to provide a reasonable check on the means which the manufacturer exercises to assure that the product bearing the certification mark complies with the applicable standards. The frequency shall not be less than once each three months, unless adequate data is provided to the department to justify less frequent inspections.

[Statutory Authority: RCW 19.28.010, 19.28.060, 19.28.065 and 19.28.070. 85-20-130 (Order 85-27), § 296-402-120, filed 10/2/85.]

WAC 296-402-130 Laboratory approval program implementation. (1) The department may establish a standing committee for the purpose of recommending action regarding approval of electrical testing laboratories, and reviewing of applications, non-ANSI standards, and other technical criteria.

(2) The department shall develop forms and procedures which will enable applicants to submit the data necessary for evaluation.

(3) The department may waive on-site inspection for a testing laboratory showing evidence of current recognition by another state determined to provide an accreditation program acceptable to the department.

[Statutory Authority: RCW 19.28.010, 19.28.060, 19.28.065 and 19.28.070. 85-20-130 (Order 85-27), § 296-402-130, filed 10/2/85.]

WAC 296-402-140 Initial laboratory evaluation. (1) The department shall:

(a) Accept requests for testing laboratory certification.

(b) Make an administrative review to ensure completeness and accuracy of information.

(c) Review the request.

(d) Arrange for the laboratory on-site inspection by a technically qualified representative of the department to evaluate compliance with accreditation criteria. The cost shall be borne by the applicant.

(2) Notification of evaluation and evaluation results. The department shall notify the applicant of the recommendation of the department and time and place of the hearing to consider the request.

(3) Fees. There shall be an initial filing fee accompanying the application, an initial accreditation fee, and a biennial renewal fee as established from time to time by the department. Evaluation costs including travel expenses and any additional related expenses shall be borne by the laboratory. On-site inspections, requiring fees, shall not be made more than once a year, unless additional inspections are required by the department or requested by the laboratory.

Initial filing fee	\$ 500.00
Initial accreditation fee:	
One product category	\$ 250.00
Each additional category for the next nineteen categories	\$ 100.00 each
Maximum for twenty categories or more	\$ 2150.00
Biennial renewal fee	50% of the amount of the initial accreditation fee

(4) Number and category. Each accredited testing laboratory shall be identified by the number of electrical product category(ies) that the department has determined the laboratory is qualified to evaluate. The accreditation shall indicate the electrical product category(ies) for which accreditation is issued.

(5) Approval. The department shall accept or deny laboratory approval. Such approval shall be subject to reexamination when deemed necessary by the department.

[Statutory Authority: RCW 19.28.060. 88-16-002 (Order 88-15), § 296-402-140, filed 7/21/88. Statutory Authority: RCW 19.28.010, 19.28.060, 19.28.065 and 19.28.070. 85-20-130 (Order 85-27), § 296-402-140, filed 10/2/85.]

WAC 296-402-150 Renewals. At least thirty days prior to the expiration date of any such accreditation, the electrical testing laboratory shall forward to the department an application for renewal. The department, upon receipt of the completed form and fee, shall renew accreditation for a period of two years or notify such applicant of the depart-

ment's refusal with reasons thereof. Accreditation may be renewed for one or more electrical product category(ies) and renewal may be refused for one or more electrical product category(ies).

[Statutory Authority: RCW 19.28.060, 88-16-002 (Order 88-15), § 296-402-150, filed 7/21/88. Statutory Authority: RCW 19.28.010, 19.28.060, 19.28.065 and 19.28.070, 85-20-130 (Order 85-27), § 296-402-150, filed 10/2/85.]

WAC 296-402-160 Conditions of accreditation. (1) Evidence of accreditation. The accreditation of any testing laboratory shall be evidenced by a letter of accreditation from the department.

(2) Period of accreditation. The accreditation of a testing laboratory shall be valid for a period of two years from the date of acceptance by the department. The period of validity shall be stated in the letter of accreditation.

(3) Maintenance of qualifying conditions. Every accredited testing laboratory shall continue to satisfy all the conditions specified in this chapter during the period of the accreditation.

(4) Reports. The accredited laboratory shall furnish the department an annual report detailing the extent of its activities for the year, and covering the products which it has certified during the year. The report shall include information concerning:

- (a) The number of factory inspections.
- (b) List of certified products.

[Statutory Authority: RCW 19.28.010, 19.28.060, 19.28.065 and 19.28.070, 85-20-130 (Order 85-27), § 296-402-160, filed 10/2/85.]

WAC 296-402-170 Penalties. Any person and/or laboratory that fails to comply with the requirements of these rules and regulations or that files a false report may have accreditation revoked for one or more electrical product category(ies) and shall bear such cost which may accrue to the department or its agent(s) as a result of the violation. A laboratory whose accreditation has been revoked may apply again for accreditation no sooner than one year after the date of revocation of accreditation.

[Statutory Authority: RCW 19.28.010, 19.28.060, 19.28.065 and 19.28.070, 85-20-130 (Order 85-27), § 296-402-170, filed 10/2/85.]

WAC 296-402-180 Notification of change. Testing laboratories accredited under these rules and regulations shall notify the department within thirty working days of any of the following:

- (1) Change in company name and/or address.
- (2) Changes in major test equipment.
- (3) Changes in principal officers, key supervisory and responsible personnel in the company including the director of testing and engineering services, director of follow-up services, and the laboratory supervisor.
- (4) Change in the standard(s) covering the certified product(s).
- (5) Change in independent status.

[Statutory Authority: RCW 19.28.010, 19.28.060, 19.28.065 and 19.28.070, 85-20-130 (Order 85-27), § 296-402-180, filed 10/2/85.]

WAC 296-402-190 Revocation and suspension procedures. (1) Revocation and suspension. The depart-

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ment on its own initiative may suspend or revoke the accreditation of any testing laboratory found to be in noncompliance with these rules and regulations, the laws of the state of Washington, or having substantial evidence of the laboratory's conduct in unethical business practices.

(2) Notice and conference. Prior to suspension, revocation, or failure to renew the accreditation of a laboratory, written notice of such intent shall be served by certified mail by the department. Within fifteen calendar days of receipt of such notice, the affected laboratory may request a conference before the department. Should the electrical testing laboratory disagree with the decision of the department, an appeal may be made to the electrical board, as provided for in WAC 296-402-200.

(3) Effect of suspension and revocation. If the accreditation is suspended, revoked, or not renewed, the laboratory shall immediately notify the involved manufacturers whose products are covered by the accreditation that such products manufactured subsequent to the revocation and offered for sale in the state of Washington can no longer bear the laboratory's label that identified it as a certified product.

[Statutory Authority: RCW 19.28.060, 88-16-002 (Order 88-15), § 296-402-190, filed 7/21/88. Statutory Authority: RCW 19.28.010, 19.28.060, 19.28.065 and 19.28.070, 85-20-130 (Order 85-27), § 296-402-190, filed 10/2/85.]

WAC 296-402-200 Appeal procedures. (1) An applicant or electrical product testing laboratory that disagrees with the action of the department regarding accreditation, qualification or approval or denial of product categories may appeal to the electrical board. An appeal shall be made in writing to the department chief electrical inspector as secretary to the board within fifteen days of receiving an adverse decision from the department. The written appeal shall state the decision of the department that is being appealed and the relief that is desired.

(2) A request for a formal appeal shall be accompanied by a certified check in the amount of two hundred dollars made payable to the department. The deposit shall be returned to the aggrieved party if the decision of the department is not sustained or upheld. If the decision of the department is sustained or upheld, the deposit shall be used to pay the expenses of holding the hearing and any balance remaining after payment of the hearing expenses shall be paid into the electrical license fund. The formal appeal shall be held in conformance with the requirements of the Administrative Procedure Act, chapter 34.04 RCW, and will be heard at a regular or special board meeting, at a special hearing date or may be assigned by the board to an administrative law judge.

(3) An informal appeal will be heard by the board at a regular or special board meeting.

(4) See chapter 296-13 WAC for additional information on appeals before the electrical board.

[Statutory Authority: RCW 19.28.060, 88-16-002 (Order 88-15), § 296-402-200, filed 7/21/88.]

Chapter 296-403 WAC
AMUSEMENT RIDES OR STRUCTURES

WAC

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WAC 296-403-010 Definitions. (1) "Amusement structure" means any electrical or mechanical devices or combinations thereof operated for revenue and to provide amusement or entertainment to viewers or audiences at carnivals, fairs, or amusement parks. "Amusement structure" does not include games in which a member of the public must perform an act, nor concessions at which customers may make purchases.

(2) "Amusement ride" means any vehicle, boat, or other mechanical device moving upon or within a structure, along cables or rails, through the air by centrifugal force or otherwise, or across water, that is used to convey one or more individuals for amusement, entertainment, diversion, or recreation. "Amusement ride" includes, but is not limited to, devices commonly known as skyrides, ferris wheels, carousels, parachute towers, tunnels of love, and roller coasters. "Amusement ride" shall not include: (a) Conveyances for persons in recreational winter sports activities such as ski lifts, ski tows, j-bars, t-bars, and similar devices subject to regulation under chapter 70.88 RCW; (b) any single-passenger coin-operated ride that is manually, mechanically, or electrically operated and customarily placed in a public location and that does not normally require the supervision or services of an operator; (c) nonmechanized playground equipment, including but not limited to, swings, seesaws, stationary spring-mounted animal features, rider-propelled merry-go-rounds, climbers, slides, trampolines, and physical fitness devices; or (d) water slides.

(3) "Board" means the electrical board established pursuant to RCW 19.28.065. The term "board" also includes an administrative law judge or board member(s) appointed by the board to hear an appeal.

(4) "Electrical board" means the board established pursuant to RCW 19.28.065. The term "electrical board" also includes an administrative law judge or board member(s) appointed by the board to hear an appeal.

(5) "Department" means the department of labor and industries.

(6) "Insurance policy" means an insurance policy written by an insurer authorized to do business in this state under Title 48 RCW.

(7) "Certificate of inspection" means a document given under oath or affirmation from an insurer or a person with whom the insurer has contracted to make a mechanical safety inspection of the amusement ride or structure. The certificate shall contain the name, address and notarized signature of the inspector, the complete description of the amusement ride or structure and the name and address of the owner or operator.

(8) "Certificate of insurance" means a document certifying that the insurance required by chapter 67.42 RCW is in effect.

(9) "Operating permit" means a permit which is issued by the department.

(10) "Operating permit decal" is a decal issued by the department which shall be affixed on or adjacent to the control panel of the amusement ride or structure in a location visible to the patrons of the ride or structure.

[Statutory Authority: RCW 19.28.060, 88-16-002 (Order 88-15), § 296-403-010, filed 7/21/88. Statutory Authority: Chapter 67.42 RCW, 86-12-019 (Order 86-16), § 296-403-010, filed 5/28/86.]

WAC 296-403-020 Insurance. An original copy of the insurance policy in an amount not less than one million dollars per occurrence from an insurer authorized to do business in the state of Washington shall be filed with the department. The insurance company shall notify the department at least ten days prior to cancelling or revoking a policy and upon the nonrenewal of the policy. A certificate of insurance shall be filed with each sponsor, lessor, landowner, or other person responsible for an amusement ride being offered for use by the public. If the insurance company withdraws, cancels, revokes, suspends, or excludes coverage of any ride(s) from any policy furnished to the department, such withdrawal, cancellation, revocation, suspension, or exclusion shall be plainly stated in documents furnished to the department. The department shall be notified within twenty-four hours of the withdrawal, cancellation, revocation, suspension, or exclusion of insurance coverage of an amusement ride or structure for which an operating permit has been issued by the department.

[Statutory Authority: Chapter 67.42 RCW, 86-12-019 (Order 86-16), § 296-403-020, filed 5/28/86.]

WAC 296-403-030 Application for operating permit. (1) The applicant for an operating permit for an amusement structure or an amusement ride shall provide the following documents on forms approved by the department:

(a) The name, address and phone number of the owner or operator of the amusement ride or structure together with the name and signature of the applicant.

(b) Description of amusement structure or ride. Each amusement structure or ride shall be individually identified: (i) By a trade name or title and a narrative description from which the amusement structure or ride can be identified; and (ii) a serial number which is welded onto the frame or contained on an identification plate which is permanently affixed to the amusement structure or ride.

(c) Certificate of inspection. Each application shall have attached a certificate of inspection which shall certify that the ride or structure has been inspected for safety and meets

the standards for insurance coverage. The signature of the inspector shall be notarized.

(d) The proper fee.

(2) Renewal of operating permit. An operating permit may be renewed prior to the expiration date by submitting an application with the proper fee and a certificate of mechanical safety inspection. The mechanical safety inspection shall have been performed within thirty days of the expiration date of the operating permit.

[Statutory Authority: Chapter 67.42 RCW. 86-12-019 (Order 86-16), § 296-403-030, filed 5/28/86.]

WAC 296-403-040 Operating permit. An amusement ride or structure shall not be operated unless the owner or operator has obtained from the department an operating permit and an operating permit decal. The operating permit decal shall be affixed on or adjacent to the control panel of the amusement ride or structure in a location visible to the patrons of the ride or structure. The owner or operator of the amusement ride or structure shall have available for inspection, at the location where the amusement ride or structure is to be operated, a copy of the operating permit for each amusement ride or structure. Each operating permit which has been issued to an owner or operator is valid for one year from the date of issue or the date of inspection whichever is less, unless revoked. The operating permit shall become null and void in the event that the insurance policy is cancelled or is no longer in effect or if an amusement ride or structure is materially rebuilt or materially modified so as to change the original action of the amusement ride or structure.

[Statutory Authority: Chapter 67.42 RCW. 86-12-019 (Order 86-16), § 296-403-040, filed 5/28/86.]

WAC 296-403-050 Temporary operating permit. A temporary operating permit for a period not to exceed fifteen calendar days may be issued by a department electrical inspector who is assured that the insurance policy required by chapter 67.42 RCW is on file with the department, that the safety inspection of the amusement ride or structure has been performed within the last year and that a proper application for an operating permit has been made.

[Statutory Authority: Chapter 67.42 RCW. 86-12-019 (Order 86-16), § 296-403-050, filed 5/28/86.]

WAC 296-403-060 Fees. The fee for issuing each operating permit and operating permit decal shall be ten dollars. All fees shall be deposited by the department in the electrical license fund.

[Statutory Authority: Chapter 67.42 RCW. 86-12-019 (Order 86-16), § 296-403-060, filed 5/28/86.]

WAC 296-403-070 Appeals. (1) A decision by the department in which; an operating permit has been denied or revoked; the department has ordered the cessation of the operation of an amusement ride or structure; an amusement ride inspector application has been denied, or certificate has been suspended or revoked, may be appealed to the electrical board. The appeal shall be conducted in accordance with chapter 34.04 RCW. An appeal shall not stay the decision

of the department. The appeal shall be filed within fifteen days after notice of the decision of the department is given by certified mail, return receipt requested, or is served upon the owner or operator.

(2) A formal appeal shall be affected by filing a written notice of appeal with the department's chief electrical inspector and shall state the decision by the department that is being appealed and the relief that is desired. The formal appeal shall be accompanied by a certified check for two hundred dollars which shall be returned to the holder of the certificate or permit if the decision of the department is not sustained by the board. If the board sustains the decision of the department, the two hundred dollars shall be applied by the department to the payment of the per diem and expenses of the members of the board incurred in the matter, and any balance remaining after payment of per diem and expenses shall be paid into the electrical license fund.

(3) An informal appeal shall be made in writing to the department chief electrical inspector and shall state the action by the department that is being appealed and the relief that is desired.

(4) See chapter 296-13 WAC for additional information on appeals before the electrical board.

[Statutory Authority: RCW 19.28.060. 88-16-002 (Order 88-15), § 296-403-070, filed 7/21/88. Statutory Authority: Chapter 67.42 RCW. 86-12-019 (Order 86-16), § 296-403-070, filed 5/28/86.]

WAC 296-403-080 Amusement ride inspector qualifications. An amusement ride inspector shall have the following minimum qualifications:

(1) Two years experience with an insurance company as an amusement ride inspector; or

(2) Two years experience inspecting amusement rides and enforcing amusement ride codes while employed by a state or governmental body regulating amusement rides; or

(3) Not less than five years documented field operating and maintenance experience with amusement rides and devices, including responsibility for erection, assembly, disassembly; personnel supervision responsibility for erection, maintenance, and operating functions; or

(4) Not less than ten years documented practical experience in the design, construction, maintenance, repair, field inspection, and operation of amusement rides and devices as an authorized representative of a recognized amusement ride manufacturer.

[Statutory Authority: Chapter 67.42 RCW. 86-24-071 (Order 86-16), § 296-403-080, filed 12/3/86.]

WAC 296-403-090 Safety and maintenance seminar. Every inspector shall annually attend at least one amusement ride safety and maintenance seminar sponsored by the American Recreational Equipment Association or an equivalent approved by the department. All experience and schooling shall be documented and verified which shall be furnished to the department with an application for an amusement ride inspector certificate.

[Statutory Authority: Chapter 67.42 RCW. 86-24-071 (Order 86-16), § 296-403-090, filed 12/3/86.]

WAC 296-403-100 On-site examination. All applicants, after payment of fees and after being deemed

qualified by experience will be required to pass an on-site inspection of a minimum of at least six rides of which no two may be the same. This on-site inspection will be supervised by the electrical inspection section and each applicant will be evaluated on his general knowledge of the field and specific criteria. If the applicant fails, the applicant may reapply in six months.

[Statutory Authority: Chapter 67.42 RCW. 86-24-071 (Order 86-16), § 296-403-100, filed 12/3/86.]

WAC 296-403-110 On-site examination content.

The on-site inspection examination will include, at a minimum, the applicant's familiarity with: Proper blocking; main bearings and bearings or bushings on each passenger container; main drive unit alignment and excess wear; entire ride lubrication and excess lubrication; proper ride R.P.M.; braking surfaces condition and effectiveness; emergency stop procedures; structural defects, broken bolts, cracked welds, etc.; missing and proper size pins and proper keys; guys, anti-sway devices, cable placement and proper tension; bolts (correct grade); alignment; operation at full R.P.M.; operator control during normal operating hours with normal crowds; machinery for proper guards; points of wear for excess wear; manufacturer's maintenance manual for specific rides and manufacturer recommended points of critical inspection; entrance, egress, and public areas for oil, broken boards, hand rails and safety restraints for waiting riders; entrance and exit sharp edges, torn metal, and exposed parts that a passenger could encounter; tubs, chairs, seats, containers, for exposed dangerous edges, safety restraints, condition of safety webbing, latches, hinges, worn parts, proper alignment of bars, doors, latches; rider operated controls; all cars, tubs or chair bushing, suspension, shocks, safety chains, safety cables; car tub or chair worn or loose bushings; exits to determine if exits could be entered or if proper restraints are in place; all electrical boxes locked; all rides have an equipment grounding conductor extending from ride back to main power source; main power properly grounded and fused; insulation on all power cords; proper fusing on branch circuits according to wire size; all splices for bare conductors and proper insulation; all cords on rides for condition, plugs and cord bodies; light fixtures secured; light fixtures for wiring methods; articulated items for wiring deficiencies, slip rings, and such other aspects and conditions as are set out in manufacturers specifications and technical data; requirements under the National Electrical Code or chapter 296-46 WAC for amusement rides and devices; rider or devices which are substantially altered, or for which manufacturer's data is not available.

[Statutory Authority: Chapter 67.42 RCW. 86-24-071 (Order 86-16), § 296-403-110, filed 12/3/86.]

WAC 296-403-120 Reciprocal certificate.

The department may upon proper application, issue an amusement ride inspector certificate to an individual who meets the minimum qualifications as set forth in this chapter and who possesses a current, valid amusement ride inspector certificate in a state or province which has equal or higher standards for amusement ride inspectors as those contained in this chapter. No amusement ride inspection examination

will be required of those persons who qualify for a reciprocal amusement ride inspector certificate.

[Statutory Authority: Chapter 67.42 RCW. 86-24-071 (Order 86-16), § 296-403-120, filed 12/3/86.]

WAC 296-403-130 Insurance company amusement ride inspector.

An insurance company amusement ride inspector may inspect only amusement rides or devices insured or to be insured by his or her employer or principle. The amusement ride inspector who is inspecting an amusement ride or device which is, or is to be insured by his or her employer, is exempt from the minimum qualifications and on-site inspection examination of this chapter.

[Statutory Authority: Chapter 67.42 RCW. 86-24-071 (Order 86-16), § 296-403-130, filed 12/3/86.]

WAC 296-403-140 Revocation of certification of amusement ride inspectors—Reinstatement.

(1) An amusement ride inspector's certificate of competency may be suspended or revoked for any cause such as certifying the safety of an unsafe ride, falsifying records or reports or certifying an amusement ride or structure which he or she has not personally inspected.

(2) No certificate of competency shall be suspended or revoked until after a hearing has been held before the department. The inspector and his employer are entitled to appear at such hearings and to be heard.

(3) The department of labor and industries shall deliver to both the inspector charged and to his employer, not less than ten days prior to the hearing, a written notice of the charges and of the time and place of such hearing.

(4) An inspector whose certificate of competency has been suspended or revoked may apply for the reinstatement thereof not less than ninety days after the time of revocation.

[Statutory Authority: Chapter 67.42 RCW. 86-24-071 (Order 86-16), § 296-403-140, filed 12/3/86.]

WAC 296-403-150 Fees for examination, certification, and renewal of certification for inspectors.

(1) Fee for each application for inspector's certificate of competency and examination \$100

(2) Application fee (nonrefundable) \$ 20

(3) Fee for annual renewal of certificate of competency, reciprocal inspector certificate, or for insurance company inspector certificate \$ 20

[Statutory Authority: Chapter 67.42 RCW. 86-24-071 (Order 86-16), § 296-403-150, filed 12/3/86.]